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ABSTRACT

An extensive list of outdoor education activities that can be integrated into the traditional curriculum is presented in this guide. Activities are arranged by grade (from kindergarten through sixth) and by subject areas taught at each grade level. Subjects covered in grades 1-6 are science, social studies, language arts, mathematics, art, music, health and physical education; kindergarten subjects include motor development, sensory development, and social and emotional growth. Each subject area is divided into units, and units into concepts, with various outdoor education activities suggested for developing each concept. Second grade science, for example, covers the concepts "Plants are different in many ways;" "Plants need sun, water, and good soil to live and grow;" and "Plants are used in many ways". Outdoor education activities listed under these concepts include school site observation of differences in plants, growing seeds under varying conditions, visiting a greenhouse, and making charcoal to use for drawing. Many activities can be carried out in the classroom or on the school site; others use the community and resource facilities beyond the community. The appendices contain a bibliography of 16 titles, detailed information about 17 outdoor educational resource facilities in the Elgin area, a list of area resource people, and maps of 15 nearby parks. (JH)

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RESIDENT OUTDOOR EDUCATION PROGRAM

CAMP EDWARDS
EAST TROY, WISCONSIN

INSTRUCTIONAL GUIDE

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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SCHOOL DISTRICT U-46
ELGIN, ILLINOIS
1970

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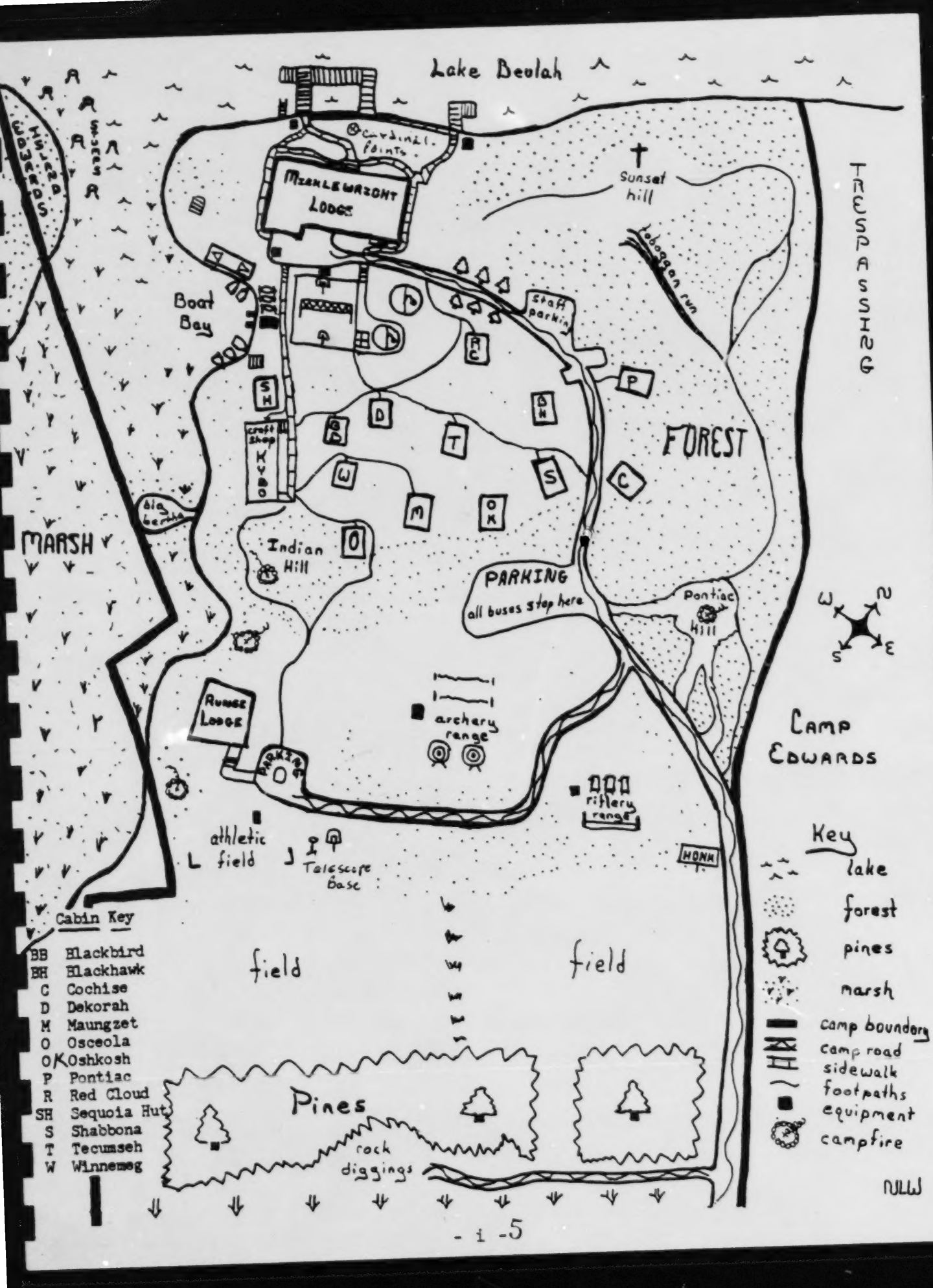
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PARKING
all buses stop here
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archery range
rifle range
athletic field
Telescope Base
CAMP EDWARDS
field
field
Pines
rock diggings
Cabin Key
BB Blackbird
BH Blackhawk
C Cochise
D Dekorah
M Maungzet
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SH Sequoia Hut
S Shabbona
T Tecumseh
W Winnemeg
Key
lake
forest
pines
marsh
camp boundary
camp road
sidewalk
footpaths
equipment
campfire
NLW

SCHOOL DISTRICT U-46
RESIDENT OUTDOOR EDUCATION PROGRAM

FOREWORD

Many elementary schools in School District U-46 have participated in some type of Outdoor Education experience over the years. Some have been a trip out onto the school playground, some a day at a location away from the school, and some to places far removed from Elgin for up to five days and nights. All of these experiences have provided children with something more than they would receive by staying in the regular school classroom. Some of the benefits have been academic, some social, and some emotional. But, all have contributed to the individual child and made him a more complete person. We hope that with a more planned approach to the practice of education in and about the out-of-doors, we may assure ourselves that children will receive the above mentioned benefits in the future.

Outdoor Education on an overnight basis has been done in School District U-46 for more than fifteen years. We have on our school faculties teachers who have participated in the Resident Outdoor Education Program as elementary students, student counselors, and now as the classroom teachers. Some have gone into teaching as a result of the Resident Outdoor Education experience.

It is hoped that all children, and especially those in the sixth grade, are able to participate in a program of Outdoor Education. All know that the experience is beneficial to all participating, but it is also known that it is a great deal of work for teachers, both before, during, and after any Outdoor Education experience if it is done well.

In order to facilitate any program, but especially the overnight camping experience at Camp Edwards, this booklet has been compiled. Included is most of the routine that must be performed in order to make a safe, smoothly run operation. If the operation is safe and smoothly run, children and adults are able to concentrate on accomplishing the goals of Outdoor Education and do not have to expend energies in solving slight mishaps and upsets that may occur.

This is not a complete work; it is only a beginning and it is in loose-leaf form so that material that is outdated or inappropriate may be deleted and new material may be added. Please feel free to suggest possible deletions and additions; many persons in the past have done so and it is hoped that many persons in the future will do so, also.

GUIDELINES FOR DEVELOPING A PROGRAM
FOR OUTDOOR EDUCATION

An outdoor education program provides an opportunity to involve students in activities that will encourage investigation of natural events, enhance classroom instruction by providing first hand experiences with natural phenomena, and enlarge upon the concepts of environmental balance, the diversity of nature, and human relationships with one another and with nature.

The key to a good outdoor education program is the flexibility that such a program provides. During the three day period at camp, a child will have an opportunity to become acquainted with the local features, the flora and fauna of the area and the intricate balance of this environment. He will also have the opportunity to venture out on his own to delve deeper into some of the mysteries that he finds of interest. The guidelines that follow are intended to provide the teacher with ideas, information, and incentive to develop a program of outdoor education that best fits the group of students with whom she is to be working.

A format has been developed that will aid the teacher in making her plans by study area, i. e., Plants, Insects, Birds, Pond life, etc. The Major Objectives that are listed in each study area are intended to provide some measurable goals that might be reached through such an outdoor education program.

The Background Information is intended for teacher use and is provided for the express purpose of giving the teachers a conceptual view of the study to be undertaken. Many resources are available for teachers in gaining further information about these subjects and these can be found in Appendix.

The Discovery Questions are intended as stimulators for student investigation within the study areas. Each question is intended to provide a direction for the investigation to be undertaken and the entire list of questions is intended to provide a gradually emerging concept of the intricate balance in nature based upon the general ecology of the area being studied.

As a means of reaching the major goals of each study area, a number of Activities have been suggested in this guide. Some of these activities can be carried on within the classroom prior to camp (Pre-Camp), some can be used as post-camp activities, but most of them deal with those activities that can be carried on at the camp area.

The most difficult part of preparing a program for outdoor education is to provide some means of measuring the results of the experience. The section Determining the Results is a list of activities that can be used for measuring the results of the activities engaged in during the camp session. Some of these can be used as post-camp activities in the classroom but many are intended for in-camp use.

The Curriculum Appendix contains various forms, worksheets, and picture suggestions. Items in this section should be duplicated as needed.

OUTDOOR EDUCATION

Curriculum Subject Areas

In Outdoor Education, the subject matter areas should not be treated as individual subjects as is the practice in the school classroom. To do this is to defeat the basic philosophy of the ecological approach to Outdoor Education. The subject matter areas should be integrated into the nature study fields and treated as tools for study and reporting of the experiences in these nature studies. The possible exceptions to this might be in the field of mathematics, especially in the area of measurement. There should also be some integration in measurement, but it is possible that measurement could be incorporated along with a unit of study with map and compass.

The following pages give some of the objectives in the fields of language arts, social studies, music, health and safety, and art. These are generally used in relation to the various fields of nature studies and are an integral part of them.

Just as supplementary activities are suggested in a basic reading program and no teacher can hope to accomplish all of these activities, so too is the case with the suggested activities in the subject matter fields in relation to Outdoor Education. No teacher will be able to do all of the activities, especially with <u>all</u> of the children. The teacher must be realistic and use some of the activities with <u>some</u> of the children who would most benefit from them, and hopefully, most enjoy doing these activities.

PLANTS (Trees, shrubs, wildflowers)

Major Objectives

1. Students should be able to identify by any one of their major characteristics (leaves, flowers, fruit, bark, general shape, size) at least six (6) of the following in each category:

Trees	Shrubs	Wildflowers
a. Red Oak	a. Gooseberry	a. White Trillium
b. White Oak	b. Raspberry	b. Red Trillium
c. Bur Oak	c. Virginia Creeper	c. Dogtooth
d. Sugar Maple	d. Poison Ivy	d. Blue Violets
e. Silver Maple	e. Sumac	e. White Violets
f. Black Willow	f. Honeysuckle	f. Wild Columbine
g. Red Cedar		g. Mayapple
h. Balsam Fir		h. False Spikenard
i. Douglas Fir		i. Solomon's Seal
j. Quaking Aspen		j. Wild Phlox
k. Cottonwood		k. Water Lily

Grasses	Other Plants
a. Bullrushes	a. Burdock
b. Cattails	b. Yarrow
c. Sedge Grass	c. Common Thistle
d. Foxtail Grass	d. Dandelion
e. Quack Grass	e. Wild Carrot
f. Kentucky Blue Grass	f. Mullen

2. Students should be familiar with the various field guides and be able to make an identification by using these guides.
3. Students should be able to recognize the diversity of species of plants and that this diversity is dependent upon the soil conditions, amount of water, amount of sunlight and the temperature range.
4. Students should be able to recognize the differences in root structure, leaf structure, stem strength, seed types, flower types, and general size that exist among the various plants in the area.
5. Students should be able to recognize the relationships that exist between the plants and animals of an area.

PLANTS

Background Information

Green plants are the foundation of the delicate "cardhouse" of our environment. These organisms have the ability to synthesize food (carbohydrates, primarily) from carbon dioxide, water, and the energy of the sun. No other organisms have this capability, and therefore, all other life is dependent upon green plants for energy.

Because these green "factories" are dependent upon raw materials and energy in order to synthesize the carbohydrates upon which all other life depends, the environment in which these plants grow must provide these raw materials in sufficient quantities. The reduction or absence of any one of the raw materials, CO_2, H_2O, and sunlight, will reduce or stop the synthesis process, correspondingly.

Fortunately for those of us who are totally dependent upon these green plants for our energy, there exists in the plant kingdom a great diversity among its members. Not all plants require the same quantity of water, sunlight, and soil nutrients for optimum food production. The marshland plants such as the cattails have root systems that can carry out their function in the wettest of soils while the red oak has a root system that enables the tree to survive well on well-drained, sandy hillsides. It would not be expected that we would find a community of cattails growing upon the side of a sandy hill or a red oak growing well in a marsh.

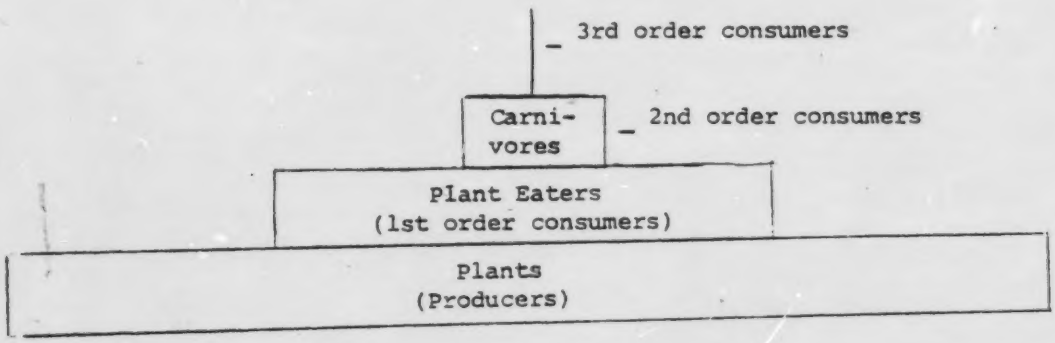
Many other factors of the environment provide for a variety of plants in a given area. Among these are: air, soil, temperature range (minimum and maximum daily and yearly temperatures), number of hours of direct sunlight, deepness of the shade under the tree canopy, soil

Background Information - Continued

acidity or alkalinity, and slope of the land.

Of prime consideration in the ecology of an area is food supply and the life that it is capable of supporting. Each plant community has within it a variety of animal life that depends upon it for food. As an example, an oak-hickory forest area contains a large variety of plant life that produces food. This food provides energy for a variety of plant-eating animals such as insects, squirrels, rabbits and mice. These herbivores, in turn, become food for insect-eating birds, owls, snakes, and other carnivores. It is possible that a hawk would depend upon these smaller carnivores for its food thus topping the pyramid of the energy usage.

The point to be remembered in considering this usage of food is that each succeeding level of energy souces supplies less food energy than the amount of food energy taken in by that level simply because some of the energy is needed for growth and activities and cannot be stored. This can best be pictured as below:



A reduction in the plant life of the area would reduce the consumers in each succeeding level and very likely not be able to support the 3rd order consumers such as the hawk. The reduction of the optimum number

of 1st order consumers (by use of insecticides, pesticides, etc.) would affect both the 2nd order consumers and the 3rd order consumers. In other words, a delicate balance exists between all levels of this energy or food chain, any disturbance at any level will affect all other levels.

In a study of plant life, the ability to identify certain species is of value only in as much as its habitat and its niche in the total community of living things can be noted. Many features of a plant can be used as identification clues not the least of these would be where it is located and what plants surround it.

Many resources that provide additional information concerning plants and their ecology are available. A list of these resources can be found in the Appendix.

PLANTS

DISCOVERY QUESTIONS

1. What plants are found in the marshland or swamp areas that are not found in the drier regions?

2. What plants are found in fully shaded areas but are not found in partially or fully sunlit areas?

3. What plants are found growing in sandy regions, in rocky regions, and in the dark humus soil?

4. What evidence can one find of competition among the plants for sunlight, food, and water.

5. Can you determine the age of a tree, the good growing years, and the bad growing years by closely examining a tree stump?

6. What different types of root systems can be found on plants?

7. What are the different types of stem structures on plants? Are they all stiff and strong like a tree trunk?

8. What are the different types of leaf formations (including vein structure, leaf stem, shape of the leaf and the size of a mature leaf)?

9. What are the different ways the leaves can be arranged on branches of different species of trees and shrubs? What might be some of the advantages and disadvantages of these different arrangements?

10. Which plants blossom when there are short days (in spring)?

11. Which plants blossom when there are long days (in summer)?

12. How can one determine whether or not a plant has blossomed and how long ago it blossomed?

13. What are the main parts of a flower and what is the function of each of the various parts?

14. Where are the seeds produced in the flower?

15. What are the different types of seeds that plants produce?

16. What are the ways in which these different types of seeds travel?

17. Which plants seem to start from seeds each spring (annuals) and which plants start their growth from last year's stems and/or roots?

18. What plants are the first to be seen growing in the spring and/or which are the ones that survive the first frost in the fall?

Discovery Questions - Continued

19. What happens to a plant when it dies?

20. Which plants seem to be providing food for insects, birds, rodents, and other animals?

ACTIVITIES

Pre-Camp

1. Make a leaf collection in the fall. Have the students in your class use the field guides (see Appendix) to identify the leaves. The leaves can be pressed and for best results, some type of lamination should be used. The best samples should be labelled and posted.
2. Make a seed collection in the fall. Acorns, maple seeds, cones of evergreens can be used to identify the various species of trees rather easily by using the field guides. These can be placed in the small plastic bags and stapled to a chart with proper identification.
3. Take a field trip to a local area near your school where various species of trees are available. After identification of a tree has been made, the students should sketch the general shape of the tree and make notes about the bark (i.e., smooth and white for birch or rough and peeling for the shagbark hickory). The best of these sketches can be posted in the room for aiding identification.

In-Camp

1. Use the trail guide for the marked Forest Trail (Green Trail) at camp. A copy of the trail guide can be found on page 14. Copies of this guide are available at Camp Edwards.
2. Use the trail guide for the marked Marsh Trail (Red Trail) at camp. A copy of this trail guide can be found on page 18. Copies of this guide are available at Camp Edwards.
3. Visit one of the densely populated forest areas on the east side of camp. Mark out an area of about 12 feet by 12 feet and collect one leaf from each tall tree within the area. These may be dried leaves but should be whole leaves.

Fasten these in one row (or 2) across the top of a 3 foot by 3 foot piece of old sheet. This can be done by making a loop of masking tape which is then applied to the back of the leaf and then the leaf is pressed to the sheet.

Repeat this procedure, taking leaf samples from the smaller shrubs and trees. Put these on the next row of the sheet.

Finally repeat the procedure, taking leaf samples of the ground cover plants.

The completed sheet will show a population profile of the forest, with the dominant plants at the top of the sheet, the lesser dominant plants in the middle, and the ground cover plants at the bottom.

The leaves can be labelled by name after returning to a work area or even after returning to school. Use a tree or plant guide for identification.

4. In the dense woods, make temperature and relative humidity readings at several different locations - at the edge of the woods, in the densest section of the woods, and in a section that appears to have lost a tree or two due to wind or disease. Compare these readings and discuss how these different environments might make a difference in the types of plants and animals that will live in these different locations.
5. Locate a tree with a low hanging limb. Spend some time investigating the limb for signs of insect life, bird life, and other animal life. If possible, have the students spend at least fifteen minutes observing this tree from a distance for bird life that may come and go from this tree.

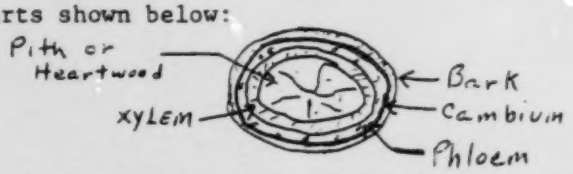
   Consider the question: "What would happen to the animal life that is dependent upon this tree if man were to cut it down or a storm were to blow it down?"

In-Camp - Continued

6. Tree growth and structure

A. Cut a small branch from a woody plant. Examine it with a magnifier.

Find the parts shown below:



Bark - Dead phloem cells. Acts as a protective covering.

Phloem - Tubes that carry sugar and starch from leaves to the rest of the tree or plant.

Cambium - A single layer of cells from which xylem and phloem cells come. Center of growth which increases the diameter of the tree or plant.

Xylem - Tube like cells that carry water, dissolved minerals and nitrogen from the roots to the leaves which use these materials to manufacture food.

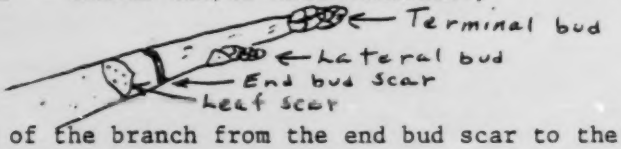
Heartwood or Pith - Old cells that have been stiffened (in a mature tree) to give strength to the tree. Pith is only found in young branches and small woody plants.

B. Try to peel each of the layers above from the small branch. The cambium layer is one cell thick so you will not be able to handle this one.

C. Lateral and Terminal Buds

Find a branch with buds on it. Look for the terminal and lateral buds as shown in the drawing below. Into what parts of the tree will these buds grow next season?

(Terminal - an extension of the branch, making it longer.
Lateral - leaves and/or side branches.)



The length of the branch from the end bud scar to the terminal bud tells us something about this tree's growth. What?

(This is this year's branch growth from last year's terminal bud.)

19

In-Camp - Continued

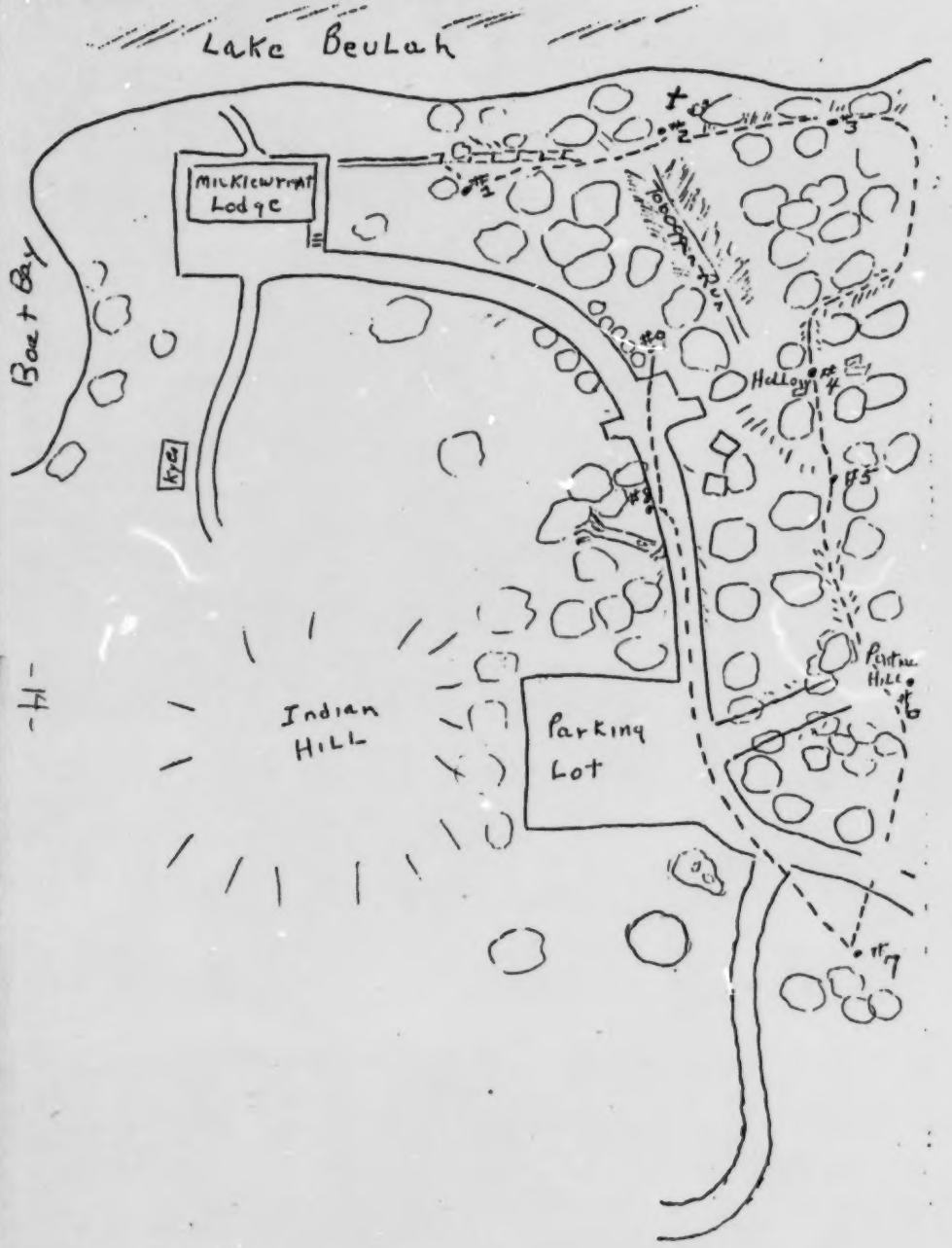
D. Locate several tree stumps in the area. Study the stump attempting to determine: (a) the age of the tree when it was cut down; (b) the years of good growth and those of poor growth; (c) the types of eroding action that has affected the stump since the cutting of the tree.

Answer: (a) Each growth ring represents one year's growth; (b) Thin rings represent poor growing conditions while thick rings represent good growing conditions; (c) Insects, fungi, mosses, freezing and thawing are all acting on tree stumps to break them down into a "sawdust like" consistency.

7. If the group appears to have the concept of the "climax forest" i.e., the dominant tree species, the underling shrubs and plants, etc., ask them to try to find several trees that appear to have been planted in the camp area and ask them to give their reasons for their decisions.

Post-Camp

1. Have students make a seed collection while at camp and upon their return to the classroom, these seeds can be planted (using potting soil) and watered until new plants are formed. A study of the conditions under which these different plants grow best could be made (varying conditions of light, heat, water, soil types, etc.).



FOREST LIFE * GREEN TRAIL

CAMP EDWARDS YMCA

INTRODUCTION

The forest area of the camp is a typical Oak-Hickory forest, with the predominant trees being the several species of oaks and a scattering of the Shag-bark Hickory. Trees, however, are not the only forms of life in the forest biome (life system). There are forest floor plants that emerge in the spring, there are shrubs that are present all year around but grow only to a height of 5 or 6 feet, and there are various forms of animal life that co-exist with the plant life in the forest.

This trail and guide will introduce you to some of these forms of life and hopefully allow you to begin to understand the intricate relationship that exists in the forest.

Materials and equipment you might need:

- -binoculars
- -flower guide (Golden Nature Guide)
- -tree guide (Golden Nature Guide)
- -magnifier
- -collecting bags (Zip-Loc bags are best)
- -insect net

REMINDER: PLEASE DO NOT MAKE COLLECTIONS OF WILD-FLOWERS OR PICK FRESH LEAVES FROM THE TREES. BE CAREFUL NOT TO DAMAGE THE BARK OF ANY TREES. THIS MEANS NO CLIMBING, PUTTING NAILS INTO TREES, OR BREAKING LIMBS, EVEN THE SMALLEST ONES.

Refer to the map on page 9 of this guide for location of trail and station markers.

1976

STATION #1 - WHITE CEDAR BY LODGE

As you stand by this first marker for the Forest Trail, look in a full circle around the Lodge. You will note two basic types of trees, deciduous and coniferous or evergreen.

The deciduous trees lose their leaves in the fall while the coniferous trees or evergreens do not. The leaves of the deciduous are generally broader in shape and lighter in color while the coniferous leaves are generally needle-like.

Coniferous trees are so-called because they produce a cone which carries the naked seeds. Most of these trees will carry their leaves all winter with the exception of the American Larch or Tamarac which can be found growing on the southwest side of the marsh.

The evergreen tree nearest the marker is a Red Cedar and the leaves are short scale-like rather than needle-like. Read about this species on the sign fastened to the tree.

The largest trees in this area are the White Oak (immediately to your left as you face the lodge). Surrounding the Boat Bay are several large trees you may recognize as the Black Willow and Weeping Willow.

In this immediate area there are also Black Cherry, Basswood, and two or three other species of oak. See if you can find the names of these other oaks by using a tree guide.

As you walk up the steps to Station #2, you will note some white barked trees on your left. These are Aspens and you can read more about them on the sign fastened to one of them near the top of SUNSET HILL.

Note the variety of underbrush on the hill that extends down to the lake. Several seedlings (young trees), grape, honeysuckle, violets and Solomon's Seal are obvious. (Refer to your Golden Nature Guides: TREES and FLOWERS.)

STATION #8 - DEAD OAK

The large dead oak that has been left lying here so that you can study it is a "bee-hive" of activity if you know where to look.

Examine the "trough" section of the trunk. This trough was formed when the tree fell during a wind storm and a section of the trunk split, part of it staying with the stump, which you can easily see.

In the trough you will note a variety of plant and animal life, moss, fungi, ants, trails of insect larvae, spiders and beetles. These plants and animals are responsible for the eventual decomposition of the tree into a very fine mulch (almost like sawdust). This mulch becomes an important constituent of the soil once it falls to the ground.

Examine the soil beneath the tree in several locations. Do you find this mulch being mixed with the forest soil?

The mulch trapped in the trough can become a suitable environment for seeds to germinate and you may find larger plants growing in this trough. These are usually annual plants (ones that live only one year) which die and also become part of the soil.

STATION #9 - ARBORVITAE

This last stop on the Forest Trail is intended to give you a look at a different type of coniferous tree, the Arborvitae, with its scale-like leaves and berry-like cone.

It is hoped that you have a better appreciation for the variety of life in the forest and for the necessity of treating it with care after spending some time examining more closely the forest and its activities.

Consider the life span of the largest tree in this area. A tree with a trunk diameter of 3 feet could be 200 years old, while one of 4 feet could be 300-350 years old. There is no way of determining the exact age of a tree until the tree is cut down and the growth rings can be examined.

Notice how the largest trees are generally 20-30 feet from each other. This indicates that each tree requires a given space not only for the branches, but also for the roots which pick up nutrients and water from the soil. If the trees were any closer, they would be in competition with one another for these nutrients, water and sunlight.

STATION #6 - PONTIAC HILL

As you look around at the plant growth in this area, you will note several Shag-bark Hickory trees and the various oaks that have been noticed before.

The clearing here has been man-made for purposes of large campfires. In the early morning, this area is alive with birds and occasionally a deer. Some of the large oak trees have branches that have broken off and are hollow. These are frequently used by the many raccoons in the area as nesting areas and for protection from rain storms.

Some of the trees have branches that are broken but have not yet fallen. These are referred to by foresters as "widow-makers". Can you tell why?

STATION #7 - WHITE PINES

These evergreens were planted here many years ago and should not be considered as "native" to the region. They survive well in the region but do not reproduce well because of the improper conditions for the growth of the seedlings.

The large evergreen by the marker is a Spruce, while the other trees with their long needle leaves are White Pine. These two species are easily distinguished from one another by the length of the needles (short on the spruce, long on the pine) and the shape of the cones that are to be found in the late summer and fall (short on the spruce, and long, narrow cones on the pines).

STATION #2 - SUNSET HILL

As you look about the area at this point on the trail, you will see several Largetooth Aspen (whitish bark), Basswood, which is characterized by the large heart-shaped leaves, and a number of Cedars.

Just to the right of the cross as you face the lake, is a dead poplar or aspen. Look closely at this tree. Note the various forms of life on it: lichens (the bluish green spots on the lake side of the tree), moss, evidence of woodpeckers or flickers (holes), and evidence of man's abuse of this tree (nails driven into the trunk at several locations).

It is possible that these nails may have caused the death of this tree, although it might have been the work of the woodpeckers and flickers. When a nail is driven into a tree or a woodpecker pecks a hole in the bark, an opening for various organisms to enter the tough outer bark is made. These organisms attack the fragile growing layer of the tree just beneath the bark. If these organisms increase in number to a point where the inner layers around the entire tree are invaded, the tree will die. The route for water from the roots to the leaves is cut off. This process is called "girdling".

As you walk to Station #3, note the ground cover (the small plants growing under the trees). In spring there will be Mayapple, Shooting Star, Wild Geranium, Solomon's Seal, False Spikenard, Bloodroot, Wild Raspberry, Bedstraw, Plantain, and our friend, the dandelion. These can be identified if you have the Golden Nature Guide, FLOWERS.

Many of these wild flowers produce seeds and die back by the time the trees begin to block out the sunlight to the forest floor.

STATION #3 - STEEP SLOPE

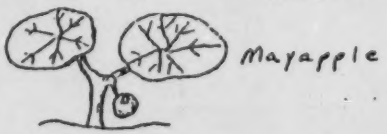
Immediately behind you as you face the Marker for this station, is a large oak tree that has been badly abused. Note the bark damage and the ant activity on the trunk, then look up and see the dead branches. It is important

to remember that the bark on a tree is like your skin. It protects the tender, sensitive parts from invasion by a host of damaging organisms, such as viruses, bacteria, mites, ants, spiders and insect larvae.

Note the trees and brush on the slope leading to the lake. The roots of these plants are most important in holding the soil on the steep bank. Without them each rain would wash tons on soil, rocks, and gravel into the lake. This area is called a "watershed".

Further down the trail from this station marker, you will see several White Birch (or paper birch). The bark of these trees peels off like paper and is often removed by unthinking hikers. Can you find evidence of someone who has removed some bark recently? Please do not take a sample for yourself!!!!

As you make the turn toward Station #4, there are large stands of Mayapple on the slopes to your right during the early part of June. Later in the summer, you may find one or two with the "apples" hanging below the two large leaves.



On the way to Station #4, be on the lookout for a Shagbark Hickory tree. You will know it by the shaggy bark that seems to be coming off in vertical strips. Look on the forest floor for hickory nuts in the late summer and fall.

STATION #4 - THE HOLLOW

As you stand at the marker for this station, look up at the tops of the trees in this area. This "cathedral" effect is not only aesthetically important, but is also ecologically important. The shading produced by this covering of tree tops creates a particular environment, one that is cooler in the summer and warmer in the winter. There is less pelting rain and less snow on the ground because of this cover.

If you were to measure the temperature and wind velocity here and compare it to, say, the athletic field at about the same time during the day, you would find a significant difference in both of these factors.

Foresters and ecologists call this covering the "canopy" of the forest.

Spend a few quiet minutes here listening to the various birds moving in and out of the canopy and the underbrush, the squirrels moving in the lower level of the canopy, and the ground squirrels (sometimes called chipmunks) rustling in the leaves on the forest floor. If you have binoculars, use them to get a close look at some of this activity. What are these animals eating? Where are their homes? What activities take up most of their time?

Because this area is low, there is a good deal of water draining into this area. Look around for large masses of moss, various fungi, and rotting stumps and logs.

There are several trees that have been damaged by a severe ice storm during the winter of 1975-76. Look for branches that have been bent or broken. Look for fresh stumps of trees that had to be cut down to eliminate a hazard to hikers.

Examine one of these fresh stumps closely and you will see the growth rings of the tree. You can figure one grow ring for each year of growth, so if the stump shows 60 rings, then we can assume the tree was 60 years old when cut down.

Closer examination of these growth rings will tell you something of the growing conditions during each year:

Thick rings - good growing conditions
Thin rings - poor growing conditions

STATION #5 - EDGE OF THE HOLLOW

Look for the large oak tree with large bumps. It is due east of the marker.

These bumps are the result of some disease or damage to the tree many years ago and the result - scar tissue - gives the tree a rather grotesque appearance.

MARSH LIFE * RED TRAIL

CAMP EDWARDS YMCA

INTRODUCTION

The marsh is a unique life system (biome). Its main characteristics are 1) the constant supply of run-off water that enters the area, 2) the lack of large plants (trees), and 3) its special plants and animals.

The marsh trail is intended to provide the hiker with a brief introduction to these characteristics and to the sounds and smells that are also a part of the marsh system.

The map on page 7 will show the hiker the locations of the six (6) trail markers. As the hiker reaches each marker, the information in this guide which corresponds to the marker number should be read. If further information is desired, the Golden Nature Guide, Pond Life, will be helpful.

Materials and equipment the hiker may wish to have along could include:

- binoculars
- waders (available in the Ice House - Micklewright Lodge)
- collecting containers (Zip-Loc bags are good)
- magnifier
- insect net
- a walking stick

REMINDER: PLEASE DO NOT COLLECT SPECIMENS OF FROGS, ARROWHEAD PLANTS, WATER LILIES AND PICKEREL WEED. (Arrowhead and water lilies are protected by state law because they are an "endangered species" or are found in limited numbers throughout the state.)

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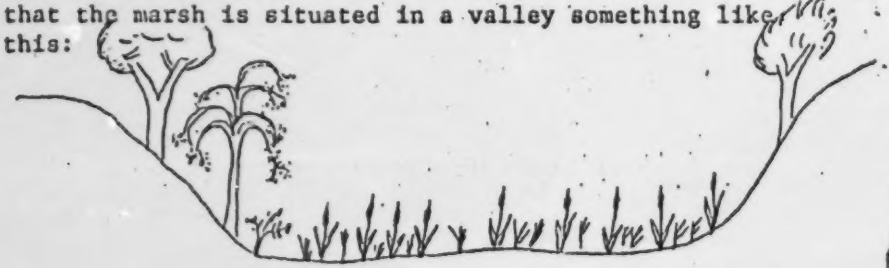
1976

STATION #1 - SHAPE OF MARSH

A marsh (swamp) is a special place with special plants and animals. It has come to be that way because of certain geographical and environmental features.

As you look at the marsh from this vantage point, try to see the whole marsh, from one side to the other. Notice that the marsh is situated in a valley something like this:

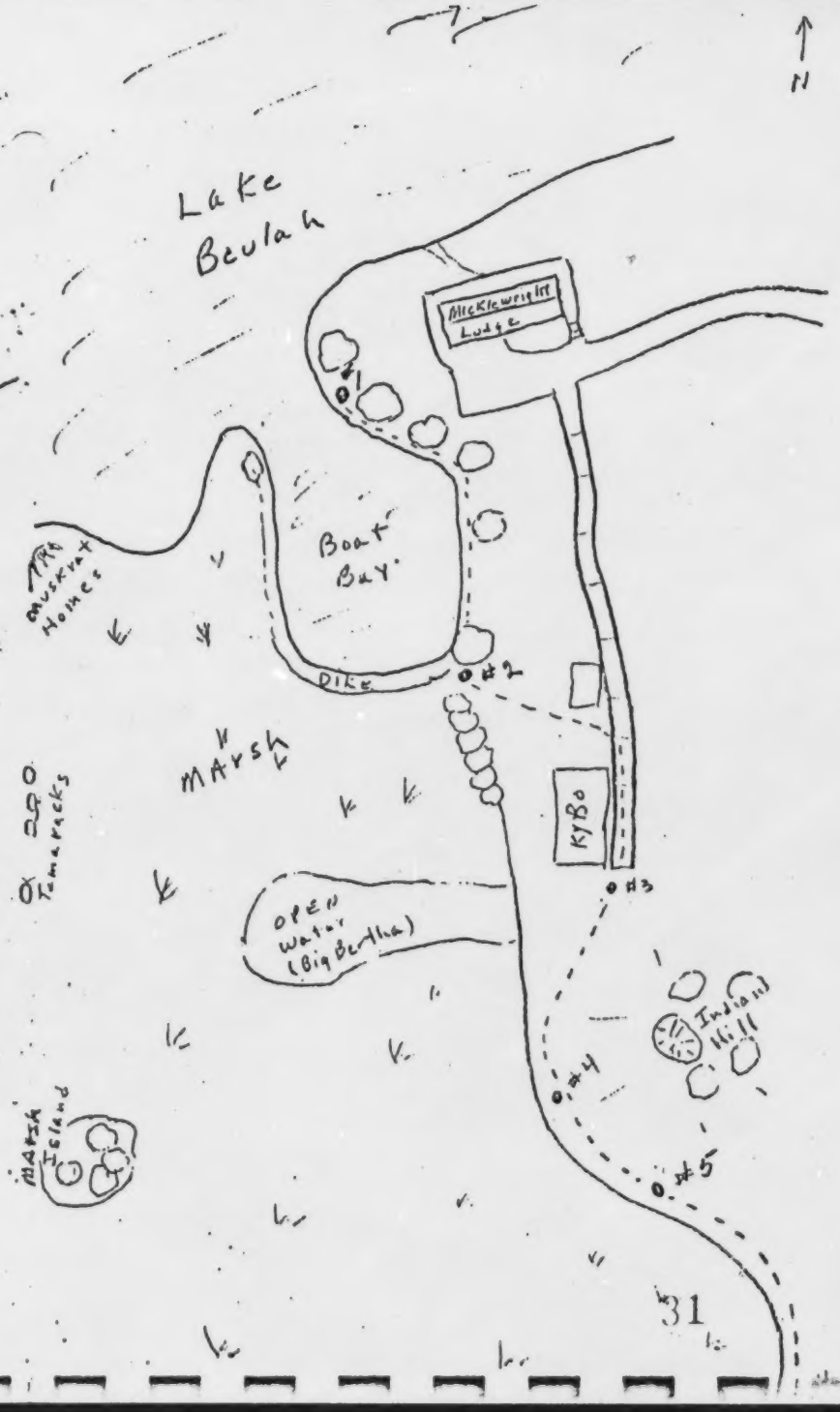


This "basin" character means that the water from the higher ground runs off directly into the marsh. This constant supply of run-off water keeps the water level in the marsh relatively stable.

There is a small stream that runs through the full length of the marsh from Army Lake to Lake Beulah. This stream - because it is moving water - remains free of typical marsh plant life. Its path can be seen in winter and spring and flows through the western third of the marsh.

At the point where the stream enters Lake Beulah, muskrats have built their homes. These can only be seen in the winter and early spring when the heavy growth has been matted down from winter snows.

Before moving to marker #2, you should stop by the Ice House to pick up a pair of waders, <u>if</u> you plan to get out in the marsh. This is not necessary when the ice is thick enough in the marsh area to walk on. (Be aware that ice around a muskrat house is often not safe to walk on because there may be "breather" holes.)



This difference in tree species is characteristic of wetlands and the surrounding land. Willows are very common to wetland areas and certain species of oak are characteristic of the bordering dry land.

Notice the small clump of trees out in the middle of the marsh - almost due west of where you are standing. This stand is on an "island" (a small portion of higher ground) in the middle of the marsh, and therefore has the proper conditions for the growth of one or two oak trees.

This area would be a good place to collect a sample of the marsh water and "soil". As you collect it, notice the oily slick on the water and the smell of the "soil". Both the oiliness and the odor are from the methane produced from the decaying vegetation. This is commonly called swamp "gas".

These samples can be studied further with the aid of a microscope or magnifier.

-20-

STATION #2 - QUAKING BOG

The boat bay to your right has been dredged out from the marsh and the boundary of the bay was made by building a "dike" of dirt around it on the marsh side.

Walk out on to the dike and look closely at the bushes that line the shore of the marsh at this point. The red bark on the bushes indicates that these are red-twigged dogwood (or red osier dogwood).

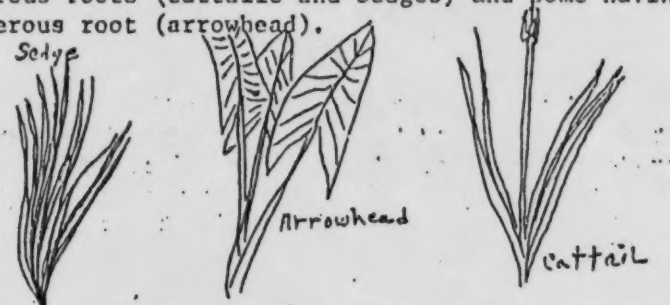
If you are wearing waders, walk a few feet into the marsh, being sure to walk on the matted plant life for support. Notice the "quaking" feeling of the material underfoot. This is literally plant material floating on the water. The bottom of the marsh may be 4-5 feet below and is usually of hard clay. You might want to poke a stick through the marsh bottom to test for depth.

Note the other plants in the marsh. Among these are the broad-leaf cattail, various sedges, and arrowhead.

Sedges have long, slender leaves that feel like a rough file when rubbed between the fingers.

The Arrowhead has arrow-shaped leaves and in the late spring a white flower is formed on a stem among the leaves.

All marsh plants have large root systems, some having fibrous roots (cattails and sedges) and some having a tuberous root (arrowhead).



Before you leave this area, note the large trees on either side of the marker. These are willows (a typical wetlands tree). The large tree on your right (North) is a weeping willow, and the 6 or 7 large trees on your left (South) are black willow.

-20-

(Don't forget to return the waders to the Ice House before proceeding to marker #3.)

STATION #3 - "BIG BERTHA"

This open water area in the marsh is somewhat unusual but it is here for a reason.

We remember that marsh plants - as with all plants - need a particular environment. The temperature of the water is part of this environment.

BIG BERTHA is probably due to an outflow from a spring. The temperature of the water entering the marsh at this point is colder than the marsh water - therefore the plant life cannot tolerate this environment.

STATION #4 - TAMARACKS

Notice the shrubs on either side of the marker. These are staghorn sumac. This is one of the few stands of sumac in camp and has gotten a start here because conditions are just right - full sun for most of the day (no overhanging trees) and a well drained area (steep slope).

The white barked trees lining the edge of the marsh are a species of birch that is tolerant of water.

The evergreen tree to your left is a red cedar and is doing well here because of the conditions (well drained soil, full sun). The slope behind has several red cedars as well.

If you have binoculars with you, look at the trees growing in the marsh on the other side. These are American Larch or Tamarack trees. They are one of the few species of coniferous (cone-bearing) trees that are not evergreen. They lose their leaves in the fall and put out new leaves in the spring.

STATION #5 - MARSH ANIMALS

Take a few minutes to sit on the hillside and listen and watch for the various animals that inhabit the marsh.

Some animals stay in the marsh for a good share of their life while others move in and out of the marsh at various times of the day.

In the spring and summer there can be seen as many as ten different species of birds that either live in the marsh or use the marsh as a source of food (its insects, seeds and frogs). Among these are the red-winged blackbird, marsh wren, three or four species of sparrow, robin, owl, mallard duck, blue herons, geese and occasionally a hawk.

Muskrats will venture throughout the open water in the marsh eating tender willow branches and other plants. These are seldom seen except through binoculars in the early morning or late evening.

A host of insects inhabit the marsh with the most common being the dragon fly and damsel fly. All of the insects have a "niche", or special position, in the system, first as consumers of plant life, then as food for birds and frogs. This is the way it is in the marsh.

STATION #6 - SWAMP "GAS"

Look at the trees on either side of this marker. These trees are oak and hickory. The hickory is the Shagbark hickory and can be recognized by its peeling bark.

Look at the tree that is growing on the edge of the marsh (to your right). This tree is a black willow and is a young tree just like the large trees near the start of the trail.

PLANTS

Activities

Post-Camp (continued)

2. If a cross section of a felled tree can be obtained from the camp director, a further study of the tree can be made in the classroom. This study might include determining irregularities in the annual rings and the reasons (possible) for these irregularities, developing a historical review showing the events in history that occured during the life of the tree, determining where branches may have grown out from the trunk and other related activities.

Determining the Results

1. Ask the students to write a story about the life of an oak tree from acorn to a twenty year old tree. Included in this story should be several ideas such as:

    a. What conditions were present that permitted the acorn to start to grow.

    b. What conditions may have encouraged good growth during some years and poor growth during other years.

    c. What animals may have lived in and around the tree during its lifetime.

    d. How certain weather conditions may have affected the tree.

2. On a map of a fictitious area, have the students label the kinds of plant life they might expect to find in certain areas on the map. The map should contain a body of water, some hills that are forested, a lowlands area and some flat but high areas. They should be able to provide the names of at least the dominant species of plants that would be found in these areas.

BIRDS

Major Objectives

1. Students should be able to recognize at least six of the common birds of the area. Among these are:

   a. Red-winged blackbird
   b. Sparrow (many sub-species)
   c. Kingbird
   d. Cliff swallows
   e. Hairy woodpecker
   f. Downy woodpecker
   g. Red-shafted flicker
   h. Red-headed woodpecker
   i. Cardinal
   j. Thrush
   k. Thrasher

2. Students should be able to use a field guide to identify observed birds.

3. Students should be able to identify at least three birds by their call.

4. Students should be able to recognize those birds that are insect eaters, those that are seed-eaters, those that feed on the ground and those that feed on the wing.

5. Students should understand the part that birds play in the ecology of an area, through their feeding habits, building of nests, spreading of seeds, etc.

6. Students should recognize that some birds travel in large groups while others travel singly or in pairs and generally stay in a given territory.

BIRDS

Background Information

The art of bird-watching is a cultivated habit of being aware of movement through the branches and in the air. Many features of a bird can be used as identification clues. Among these are: coloration, song flight pattern, shape of bill, length of tail, nesting habits, feeding habits, and certain special marking such as white wing or tail bars, crests, black caps, etc.

A good pair of field glasses or binoculars are always helpful in getting a better look at a bird high in the branches. It is always best to have the sun at your back when observing birds in order to have the proper lighting on them. The distinguishing marks are much easier to read with proper lighting.

Quiet is important in making bird observations. A group of children need to be "tuned in" for proper observing. Sitting quietly for ten minutes on the edge of a wooded area will result in the identification of six to ten species of birds that travel to and from this area if the children have been made aware of how to look and listen for birds.

When identification of a particular species of bird is made, a number of other observations should be made at the same time. Among these are: the type of area where sighted (forest, marsh, field, etc.), activity in which the bird was engaged (nest-building, feeding self, feeding young), mate present or absent, does the bird appear to be in a territory or just flying through, and direction of flight (tree to tree, tree to ground, ground to ground, ground to tree, etc.)

Background Information (continued)

Classification of birds into large groups can be done in many ways, but perhaps one of the best ways insofar as children are concerned would be by the birds feeding habits. Seven categories could be used for this classification:

1. Seed-eaters -- thick, short bills usually feed on the ground or in shrubs.

2. Insect-eaters -- thin bills of medium length, some very sharp for stabbing prey.

    a. Flycatchers -- usually catch prey in flight.

    b. Woodpeckers -- chisel into bark for larva and adult insects.

    c. Ground feeders -- stalks prey on ground.

3. Fish-eaters -- usually have long, thin bills and are adapted to swimming, good divers.

4. Aquatic surface feeders -- medium length, flat bills, adapted to swimming, seldom dive but often immerse head and neck to feed on bottom.

5. Shoreline feeders -- medium to long bills often spear-like, medium to long legs adapted to wading in shallows. Use the characteristic stabbing motion while feeding.

6. Flesh-eaters -- often have thick, curved bills and claw-like feet, strong, thick necks, all of which are used to tear flesh from prey.

7. Scavengers -- usually have strong bills, feeds on the ground upon various dead and decaying foods such as fruits under trees, dead animals, picnic garbage left by man.

Observation of bird homes can be of great interest especially if time is spent to investigage the types of materials used to make a nest, the method of construction and the protection afforded by such nests. A number

Background Information (continued)

of birds use holes in dead trees for their homes, others make their own holes in branches or trunks of trees, some make suspended, bag-like nests with the entrance in the bottom, some make nests very close to the ground, others make nests high up in the trees, and some burrow into the ground to make nests.

Birds fill one "niche" in the environment of an area and provide for that area a means of control of insects, seed control and dissemination, control of rodents, and fish population, and food for flesh-eating insects and animals.

However, because birds have the ability and instinct to migrate, not all birds found in an area represent permanent residents. The migratory birds play only a small part in the ecology of any area because of the short duration of time they spend there. Prime consideration should be given to those birds that are residents of the area for all or part of the year.

BIRDS

1. What are the different species of birds that can be observed in the area?

2. Which of these birds seem to move about as a flock and which seem to move about as singles or pairs?

3. Which of the birds feed on the ground, in bushes, in treetops, on tree trunks, in the air, along the shoreline, in the water?

4. Which of the birds seem to be seed eaters, insect eaters, worm eaters, fish eaters, or omnivorous (eats seeds, insects, worms, etc.)?

5. Which birds seem to be most active early in the morning, middle of the day, late in the evening, only at night?

6. Which birds seem to nest in the highest part of the trees?

7. Which birds nest in the bushes?

8. Which birds nest on the ground?

9. Which birds nest in hollow tree trunks?

10. What types of materials do birds use to make nests?

11. What are the different types of bills that can be found on birds?

12. What are the different types of flying styles or patterns that are used by birds? Can these patterns be used as an identifying clue?

13. What are the differences in coloration between the male and female of a species?

14. What are the major characteristics of bird feathers?

15. What are the various types of feet that birds have, and what types of tracks do these birds make in mud, dust, sand, etc.?

BIRDS

Activities

Pre-Camp

1. Establish a feeding station on the school grounds in order to offer students the opportunity to learn to observe and recognize birds of the school area. Feed should consist of millet, corn, sunflower seeds, and oats or wheat for the seed-eating birds and suet for the insect eating birds. Keep a bird guide handy so that in the event a student cannot readily identify a bird, he can easily turn to the bird guide.

2. Prior to a field study, some exercise in listening for various bird calls would be beneficial. This can be started by picking out six or eight common bird calls on the records, A Field Guide To Bird Songs, Houghton, Mifflin Co., Geneva, Ill. (2 12" LP Records, $10.95). Repetitions of these bird calls will aid students to "zero in" on these when they go into the field. A "listening" hike can be planned for around the school yard as a means of practicing these skills.

In-Camp

1. Take a field hike, stopping at each of the following areas for ten minutes of observation time and record sightings and observed behavior:

    a. Marshland
    b. Mowed meadow area
    c. Deep forested area
    d. Shoreline of lake
    e. Near lodge

BIRD CLUE CHART

Size Comparison	General Shape	Color or outstanding marking	Location	Song	Flight Pattern	Observed Activity	Common Name
1.							
2.							
3.							
4.							
5.							
6.							

BIRDS

Activities

Post-Camp

1. Pool the children's in-camp observations of birds by placing their information of sightings on a large map of the camp area. Discuss these sightings in reference to the places frequented by the various species.

2. Plan and build a bird feeder for the school grounds, preferrably near your classroom window. Have the children continue their sightings of birds using the bird clue chart as shown on a preceding page.

Determining the Results

1. Prepare a number of bird silhouettes. These need not be of any specific species. Label these with the names of those birds seen in camp. Have each student pin a silhouette on a large picture of a landscape (hand-drawn by students or a magazine photograph). The proper placement of these silhouettes will indicate the students' knowledge of bird habits.

2. Play back the tapes made at camp. Ask the students to identify the bird, the place where this bird might be seen and its general description.

INSECTS

Major Objectives

1. Each student should be able to identify at least six common insects of the area by their physical appearance and their habitat. The identification should be by their correct common name and should include those from the following list:

   Monarch butterfly
   Viceroy butterfly
   Orange sulfur butterfly
   Imperial moth
   June bug (correct name--May beetle)
   Click beetle
   Ground beetle
   Lady bug (correct name--Lady beetle)
   Diving beetle (aquatic)
   Giant water bug (aquatic)
   Stink bug (true bug)
   Leaf hopper
   Locust (correct name--Cicada)
   Locust (correct name--shorthorned grasshopper)
   Grasshopper (several species)
   Common honey bee
   Bumble bee
   Deer fly
   Dragon fly
   Damsel fly

2. Each student should be familiar with the two different cycles of development that insects may undergo, complete metamorphosis and incomplete metamorphosis. They should be able to recognize and name the four stages of complete metamorphosis; egg, larva, pupa, adult.

3. Each student should have an understanding of the interrelationship that exists between insects, plants, and other animals, and should be able to provide an example of this interrelationship including food, shelter, reproduction, temperature control, and decomposition of dead material.

4. Each student should be familiar with the activities of one of the social insects such as the ant. Each should be able to recognize the division of activities, i.e., worker, soldier, queen.

Insects - Continued

Discovery Questions

1. What types of flying insects are found near a swamp or marsh?
2. What types of flying insects are found near a forest area?
3. What types of flying insects are found in a grassy (prairie) area?
4. What different species of beetles can be found in a given area?
5. If an ant nest can be found, the following questions might be considered:
   a. What type of material has been used as a nesting site?
   b. What does the entrance to the nest look like?
   c. Are there different species of ants present or only one species?
   d. Are there different sizes of the same species present around the nest?
   e. If the center of the nest can be observed by opening up the nest, can different tasks be noted being performed by the ants?
   f. Can the queen ants or ant be found in this nest?
   g. Can you find the "eggs" (the white, eggshaped objects are not really eggs but are the pupal cases from which young ants will emerge. Ants go through a four-stage change, egg, larva, pupal, adult.)
   h. What kinds of food are being brought into the nest and how does it get down to the ants in the center of the nest?
6. What types of crawling or hopping insects are found near a swamp or marsh?
7. What types of crawling or hopping insects are found in a forest area?
8. What types of crawling or hopping insects are found in a prairie area?
9. What types of insects might you find under a rock or a log?
10. What types of insects are attracted to a light at night?
11. If possible find a plant gall, a swelling of a stem, leaf surface, or bud. What evidence of an insect larva can you find inside?

12. Is there evidence that the insect larva in this gall has matured and the adult insect has escaped?

13. What types of plants seem to be most susceptible to insect galls?

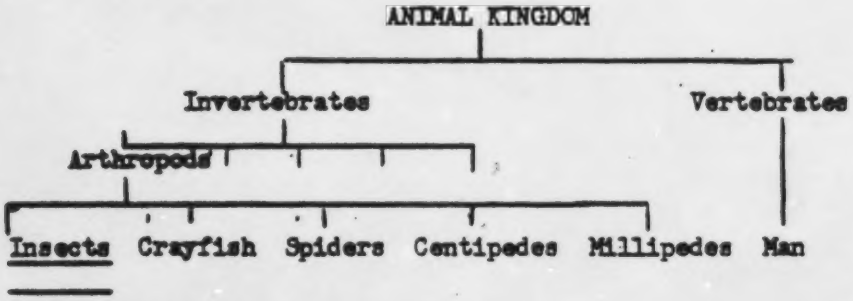
14. In the spring, what different types of caterpillars can be found?

15. What evidence can you find that insects use plants for food?

16. Where might you find bees?

Background Information

Insects make up, by sheer numbers, a large part of the animal kingdom, yet they belong to only one class of animals. The diagram below provides you with a perspective of the place these animals hold in the taxonomy of the animal kingdom.



The common physical characteristics of insects are as follows:

a. Three pairs of jointed legs
(all arthropods have jointed legs but only insects have three pairs)

b. Hard outer skeleton

c. Segmented body - usually made up of three parts; head, thorax and abdomen.

d. One pair of antennas.

Other structural characteristics that are common to insects but also are found in other invertebrates are: compound eyes, spiracles or openings

in body through which they breathe, wings, and hearing organs often located in the abdomen and sometimes on the front leg.

The mouth structure of insects provides an excellent clue to their eating habits. Grasshoppers have the chewing mouth which is usually short and wide, as do most beetles. True bugs have narrow snout-like mouths for piercing and sucking the sap from plants while butterflies have a long straw-like "tongue" that rolls up when not in use but can be unrolled to suck the nectar from flowers. Mosquitoes have a needle-like mouth for piercing the skin of other animals and sucking the blood from them. Bees have a long, narrow mouth that enables them to lap up the nectar from plants such as a dog or a cat laps up water. The mouth of the fly consists of a narrow stem with a flat, sticky structure on the end. This flat end is used to pick up small pieces of food which is placed in the mouth opening behind the stem.

Because insect life is so diverse in nature it would be unrealistic to imagine that you or your students would be able to identify all of those in which you might come in contact. After all, there are estimated to be 5,000,000 species of insects in the world. It would be best that only the most common orders of insects (groupings) such as those listed in the objectives be considered and from these only a few representative species be studied with the emphasis of study on:(a) life cycle; (b) habitat; (c) main source of food; (d) social activities - if any; (e) life span.

ACTIVITIES

Pre-Camp

1. Using pictures, live specimens, or prepared specimens, examine the insects for the characteristic body structures that class the animal as an insect. Study the mouth parts to determine the feeding habits of each insect. Using one of the insect guides suggested in the Appendix, have the students identify those with which they are not familiar.
2. Start an ant farm by finding an established ant nest and collecting fifty or more ants, some of the eggs, and some of the soil in which they were found. Place these in a large glass jar or old aquarium which has been covered on the outside with black paper. After two or three days remove the paper and examine the tunnels, egg sanctuaries, and travels of the worker ants. This observation can be carried on for about an hour before the ants have retreated to the center of the nest then the black paper must be replaced for a day or so.
3. Have the students collect various larval forms that they might find around their homes, such as; caterpillars, grubs (in the soil), maggots (larval forms of the house fly). If food is provided, it is possible to observe the pupal stage and the adult immerging from the pupal stage.

In-Camp Activities

1. Team students in groups of two or three and have them plot out a one foot square of grass area. Have them observe closely the insects that are present within that one foot square keeping a record of all insects observed, the number, the activities, and whether or not they stayed with that area. Have groups compare their recordings when they are together as a group. Repeat for other types of areas, such as the floor of the forest.
2. Find an ant"hill" and excavate it carefully so that suudents can observe the various activities within the nest. List the activities and compare to a human society such as in our homes, in our school, or in our city.
3. On the floor of the forest, the plant life is scarce due to the lack of sunlight. Using a sieve made of screening, dig up several shovels-full of the soil and sift it carefully to find what insects are living in the soil in any one of the several stages; egg, larva, pupa, or adult.
4. Collect a variety of insect galls. These can be found easily if one looks for an abnormal growth on plants. A swelling on the stem of a plant, the back of a leaf, the stem of a leaf, and even the roots of a plant are good indications that an insect has laid its eggs under the surface of the plant and the plant has been induced to grow around the egg. Inside this gall should be the larva of the insect or at least some evidence that a larva has been there. Make a display of the various types of galls that can be found. Use "Some Plant Galls of Illinois" booklet for identification purposes.

In-Camp Activities - Continued

5. Insect collections are useful only in so much as they serve a useful purpose. If insect collecting is to be done, it is suggested that the collection be used for one of the following purposes;

   a. Orientation of students to insect habitat. This can be done by making a cigar box diorama of a grasslands, forest, marshland, or other ecosystem (small balanced region) and insects common to such a system can be pinned to the part of the diorama in which they are likely to be found.

   b. Feeding habits. A large poster on which pictures of leaves, flowers, animals, a log, and other typical food of insects have been drawn can be used as the base for the display of the insects. The insects should be pinned on the picture that represents the major source of food for that particular insect.

   c. Nocturnally active insects. Turn on a light outside and within a few minutes there will be a number of flying insects collecting around this light. These insects are generally most active during the night, and if collected can be made into a display of insects with special habits, in this case, nocturnal.

   d. A display of insects that have chewing mouth parts will provide a lesson in close observation. There can be separate displays of those insects with piercing and sucking mouths, those with siphoning mouth parts (such as moths and butterflies), and those with lapping mouth parts such as bees.

Post-Camp Activities

1. Investigate pesticides and their use. Are there better means of control? How do the pesticides cause death of insects? What harmful affects do pesticides have on other animals and man?

2. Make an in-depth study of one of the social insects such as the honey bee. If someone in class knows of someone who keeps an apiary (bee-hives), try to arrange for him to visit the class to discuss his hobby and the behavior of bees.

Determining the Results

1. List ten areas in the camp and have the students name one insect that might possibly be located there.

   a. Grassy knoll.
   b. Large oak tree.
   c. In forest soil.
   d. Over marshland area.
   e. In a dead log.
   f. Under a rock.
   g. In the lake.
   h. On the bark of a tree.
   i. In the air in the forest.
   j. In the lake along shore.

2. Provide a list of foods and ask the students to name one insect that uses this as its major source of food.

   a. Leaves of trees.
   b. Leaves of grass.
   c. Decaying wood.
   d. Other insects.
   e. Decaying animal flesh.
   f. Bark of a tree.
   g. Stems of a plant.
   h. Juices of a plant.
   i. Nectar of flowers.
   j. Blood of animals.

ANIMALS (OTHER THAN INSECTS AND BIRDS)

Major Objectives:

1. Students should be able to identify and be familiar with the habitats of at least six of the following common animals of the camp area:

Mammals	Reptiles	Amphibians
a. Red squirrel	a. Painted turtle	a. Green Frog
b. Cottontail rabbit	b. Snapping turtle	b. Tree frog
c. Racoon	c. Box turtle	c. Spring peeper
d. Skunk	d. Garter snake	d. Bullfrog
e. White-tail deer	e. Bull snake	e. Leopard frog
f. Woodchuck	f. Green snake	f. Spotted salamander
g. Ground Squirrel		g. Red-spotted Newt
h. Chipmunk		h. Tiger salamander
i. Deer mouse		
j. Muskrat		
h. Beaver		

2. Students should be able to show how one of the above relates to its total environment including: a) place in food chain; b) use of plant life for building homes; c) camouflage of animals in its natural habitat; d) reproduction of species as related to environment.
3. Students should be able to identify at least four of the above animals by outward signs rather than actually sighting the animals. Some of these signs might be: a) tracks in soft earth; b) burrows or nests; c) feeding spot.
4. Students should be able to show understanding of the importance of maintaining the presence of these animals in the environment and that man can upset the environment in such a way as to prohibit the sustaining of these animals.

ANIMALS (OTHER THAN INSECTS AND BIRDS)

Discovery Questions

1. What different types of animal homes can be found in and around a tree?

2. What different types of animals' homes can be found in the ground?

3. What animal tracks can you find and which animal makes which tracks?

4. Can you tell from the direction, arrangement, and number of tracks the kind of activity in which the animal was engaged when he made these tracks?

5. If possible, observe the movements of the squirrel or chipmunk for 15 minutes. What seems to be the major task that this animal spends most of its time performing?

6. Locate, if you can, the storage area that a squirrel uses for the acorns, seeds, and other types of food it finds. Note the varieties of food. What types of seeds are in greatest number? Why do you suppose the squirrel has collected these rather than some other kind?

7. Many small animals sleep during the day and hunt for food during the night.

8. What evidence can you find that some animals are plant eaters and others are meat eaters (carnivores)?

9. Spend some time observing a frog. What is its major source of food?

10. How does the frog catch its food?

11. Where is a frog most likely to be found? Why?

12. Salamanders are similar to frogs in that the first part of their life is spent in the water. Where would you be likely to find a salamander? What types of food would you expect a salamander to eat?

13. If a small garter snake can be found, answer the following questions concerning the snake by observing it over a period of time:

    a. Are snakes "slimy"?
    b. Do they have skin or scales like a fish?
    c. Why do you suppose the snake keeps sticking its tongue out?
    d. Does the garter snake have teeth?

14. Turtles are reptiles just as snakes and display some of the same physical characteristics, habits, and live in similar habitats. Can you list the likenesses and differences between these two species of repitles through observing each?

BACKGROUND INFORMATION

Animals in the forest are instinctively shy and defy direct observation unless they have become accustomed to the trampings of man. Often it is necessary to observe the presence of these forest animals by indirect means, i.e., burrows, nests, food caches, remnants of nuts, and tracks.

Because many of the mammals are nocturnal animals and do much of their hunting for food in the dark of night, it is often necessary to attempt direct observation of these animals by taking an early evening hike or to station oneself near a known path that will be travelled by one or more of the animals.

In any study of animals life, man gravitates to an organization of known characteristics of the animals. Generally there are five major divisions of vertebrate animal life:

Mammals
- a. Covered with fur on all or part of body.
- b. Feed young milk produced in mammary glands.
- c. Breath with lungs.
- d. Usually bear young alive.
- e. Warm-blooded. (Body temperature is constant.)

Reptiles
- a. Covered with hard scales.
- b. Generally lay leathery shelled eggs.
- c. Cold-blooded. (Body temperature fluctuates with environment.)
- d. Breath with lungs.

Amphibians
- a. Covered with a smooth skin.
- b. Lay eggs in a jelly like substance, usually in or near water.
- c. Young have gills and must live in water.
- d. Adults generally have lungs and can live out of water.
- e. Cold-blooded.

Many animals exhibit "territorialism". This means that they will mark out a territory that they consider as their own for hunting purposes, for mating and raising a family, and for protection against the foraging of others. This territory may be marked by urine, musk from special glands,

or oil from fur. Since the sense of smell is extremely sensitive in most animals, any foreigner venturing into this territory can tell by the odor markings that he is trespassing and to beware. The "owner" can also smell the presence of the trespasser and often a fight ensues. If the original owner loses, the territory may be taken over by the victor or left for some other territory seeker to stake out.

Many of the forest animals act as hosts for a variety of small insects and occasionally a viral disease. Fleas and lice are not uncommon among wild fur bearing mammals nor is the presence of rabies. It is best to not attempt to handle or feed from the hand any of the animals even if they appear to be most friendly. Man, being a mammal, is also as susceptible to the same insects and viral infections as his forest "cousins".

ANIMALS (OTHER THAN INSECTS AND BIRDS)

Activities

Pre-camp

1. Read various stories that tell about the life of animals. Reader's Digest often provides excellent accounts of the lives of various animals through the seasons of the year. This offers the students an insight into the problems encountered by the various animals just to survive.

2. Have the students make a study of their pet or a friend's pet. They might report to the class on such questions as:

   a. What is the pattern of foot movement? Does the animal move both feet on the same side of its body forward at the same time? Does this movement change when the animals are running?

   b. Where are the eyes located in relation to one another? Are they close together and probably work together or are they far apart on the head and work independently of one another?

   c. How does your pet eat? Does it bit off a piece of meat with its front teeth or its side teeth? Does it shake the piece of meat before it eats? Why might it do this?

   d. Does your pet have whiskers? Of what purpose might these whiskers be?

   e. When playing with your pet, of what use does it make of its hind feet other than walking or running?

In-Camp

1. On a hike along a roadway, have the children look for signs of animals. They should look for nut husks, hair, fur, nests, holes in the ground and tracks.

2. Prepare a "track trap". Prepare the surface of the ground around a baited area with mud, flour, or a watery clay mixture. Bait the area with bread, cheese, and/or bacon pieces. Check the area in

the morning to see which animals have visited during the night. If possible make casts of these tracks for further study.

3. Spend some time sitting quietly observing the action of a squirrel, chipmunk or some other nut gatherer. Make a count of the number of nuts gathered, where the nuts are stored, how they are carried, and if possible what kind they are. If the storage area is accessible, investigate and note how the nuts are stored.
4. Look under rocks and logs in the dense forest area where the ground stays moist. Salamanders can often be found in such places. Capture a salamander and place it in a terrarium. Discover by experimentation the best kinds of food that will satisfy this animal. What kinds of natural foods would you expect it to eat?
5. If a frog can be observed without disturbing it, find out how it catches its food. What food does it catch? How much food does it catch in a given time (15 minutes)?

Post-camp

1. Have each student choose one animal that they have observed either directly such as a squirrel or indirectly such as a racoon and write a story about one day in its life. It may help if they write the stories as if they were that animal telling about itself.
2. If plaster casts of tracks were made, an extensive study can be made of these to try to determine: 1) how the animal walks: 2) how large the animal was; 3) what activity it was engaged in; 4) relative sizes of hind and fore feet.

Determining the Results

1. Prepare a pencil and paper test such as the one on the next page. In the administration of such a test, it is possible that more than one answer could be called for but there should be at least one animal that could be listed.
2. Make a bulletin board display of the camp showing the marsh, forest, and grassy areas. Ask students to list those animals they might expect to find in each of the three areas, those that might be found in all of the areas, and those that might be found in two of the three but not in the third area (due to lack of food or some other condition).
3. If plaster casts of tracks have been prepared. a test of the student's ability to identify these might be of value.

MARSHLAND ECOLOGY

Major Objectives:

1. Students should be able to relate the environmental conditions of the marshland (water, temperature, soil constituents) to the types of plants that grow in the area.
2. Students should be able to interpolate and extrapolate and the successional growth of the area, i. e., formerly open water that silted in and water lilies, cattails began to flourish until reaching its present condition.
3. Students should be familiar with the food chain that exists in the marshland area.
4. Students should be able to show a relationship between the marshland and the surrounding areas, i.e., food, humidity, temperature, wind.

Marsh and Swamp Life

Discovery Questions

1. What types of plant are found growing in the marsh(where the wettest surface is found)?

2. What types of plants are found growing in the drier parts of the marsh?

3. As you look at the general shape of the marsh, what could this area have been 10, 20 or 30 years ago?

4. Are there trees growing in the marsh?

5. What types of root systems do the plants living in this marsh area have?

6. What seems to be the main materials that makes up the "soil" in the marsh or swamp area?

7. What types of insects and animals are living in this area?

8. What evidence can you find that other animals visit this area from time to time?

9. Measure the air temperature and relative humidity in this area. How does it differ from that in other areas that you have studied?

10. Measure the temperature of the "soil". How does its temperature compare to other soil temperatures you have measured?

11. How many hours of sunlight (direct) does this area receive in a day?

12. Is there a wind present? How does it affect this area?

13. Collect samples of the "soil" and water (if any) and study the life forms by use of the hand lens and/or microscope? What types can you find?

14. What food chain would appear to exist in the area?

MARSHLAND

Background Information

The marsh is a fine example of the law of succession. This area at one time was open water just as the lake is at present. As more and more silt (soil)was washed into the lowlands and the dead and decayed aquatic plants built up the fertility of the bottom of the lake as well as making the water more shallow, the water lilies, cattails, and pickerel weed found conditions right for growth and reproduction. These plants in turn continued the filling up process until the marsh is as it is today. Cattails and sedge grass are the dominant species of plants in the marsh with black willows and birch bordering the edge.

It can be expected that if one were to return to this area in 10 or 20 years the succession of plants would have continued and the edges of the marsh would have receeded toward the middle. More willows and birches would be growing where only cattails and sedges grow today. Perhaps several tamaracks would have taken root and grow in the moist, rich soil of the marshland.

Eventually the prairie grasses or forest trees will become the dominant vegetation indicating the final stage of succession and the marsh will exist no longer.

A study of this specialized area (ecosystem) can provide an excellent opportunity to see first hand how plants adapt to their environment, how a particular kind of environment will support certain forms of animal because of their adaptions, and how this special area has an influence over the kind of local climate that is present.

The marsh offers a variety of animal life, especially insects, frogs, and birds. A variety of microscopic animals can be found in the fertile

water in the marsh which play an important part in the formation of soil from dead plants.

Insects that are commonly found around wet, marsh lands include: mayflies, dragonflies, damsel flies, stoneflies, mosquitoes, crane flies, water spiders (not true spiders), water boatman, whirligig beetle, and the crawling water beetle.

Microscopic animal life would include: water fleas, fairy shrimp, cyclops, and tadpole shrimp. A number of these can be seen with the aid of a hand lens but for a more detailed study of these microscopes should be used.

Plant life consists of: cattails, sedges, saw-grass, bedstraw, and black willows. Various algae can be found floating in the open water and should be collected and observed under the microscope.

MARSHLAND ECOLOGY

ACTIVITIES

Pre-Camp

1. Students who may know of an area around their home that is generally wet most of the time, might be asked to collect some of the plants, soil and water of that area to study in the classroom before actually going to camp.

In-Camp

1. Use Trail Guide (see page 18) for the Marsh Life Trail at camp. Copies are available at camp.
2. Dig up one or two of the characteristic plants of the marshland area and examine the root system. How does it compare to land plants?
3. Using an insect net, make one complete sweep from right to left and back again. Examine the variety of insects in the net. Try again at a lower level. Note any differences in the kinds of insects.
4. Collect a small can or jar full of the soil of the marshland. Spread it out on several thicknesses of newspaper and try to discover the variety of life in this small sample of soil.
5. Spend 15 minutes sitting on the hillside overlooking the marsh. Keep track of the number and kinds of birds seen flying into or over the marsh. Record these sightings and include, if possible, the activity these birds seem to be engaged in.
6. Find a place from which most of the marshland can be seen. Ask each student to make a sketch of what they see. Closer observation can aid them in indicating the placement of dominant plants.

In-Camp - Continued

7. Collect a sample of the water from an open area in the marsh. Let it settle for about an hour and then note the animal life that is in the sample. A hand lens will aid in closer observation but by using an eye-dropper, a glass slide (depression) and a cover slip, the microscopic life can be observed in their natural environment. A container can be saved for further observation in the classroom.

8. Sediment

   A. Take water samples from lake, boat bay and marsh using collecting jars with covers. Let them stand for an hour and check the amount of material that settles out.

   B. This could be done more quickly by using a funnel and filter paper to filter the solid materials in water.

9. Hardness of Water

   A. Make up a soap solution made up of 1 part liquid detergent and 99 parts water.

   B. Collect samples of water in test tubes.

   C. Add one drop of soap solution to each sample and shake each vigorously. Note the head of suds produced: few suds - hard water, many suds - soft water.

10. Amount of dissolved minerals in water samples

   A. Collect water samples and pour an equal sample of each into metal pans.

   B. Let water evaporate and check on amount of minerals left in pan.

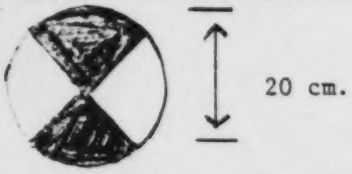
   C. Use magnifier to look at crystals of minerals left after evaporation.

   D. Discuss how these minerals got into the water.

In-Camp - Continued

11. Transparency - Clearness of water

A. Make a disc out of wood or metal. Color it black and white as diagrammed.



B. Drill a hole in the center and attach a weight to the back side by rope. The rope should be 10 feet long at least.

C. To check turbidity - lower the disc down to where it can't be seen, then raise it so it can just be seen. This is the distance of visibility and also the penetration distance of sunlight. Plants will not grow below this depth.

12. P^h of water

A. Collect samples of water and label.

B. Take a piece of P^h paper for each sample. Dip the strip of paper in the sample and check color of strip with P^h key.

13. Temperature

A. Using any reliable thermometer, make water temperature readings at several points along the marsh and boat bay shore.
You may find differences due to springs and surface drainage.

B. It is possible to check temperatures at various depths in the boat bay and lake by cutting holes in ice and lowering a minimum-maximum thermometer to a given depth (as marked on the string attached to thermometer). The minimum side of the thermometer will register lowest temperature at that depth.
Be sure to remove thermometer quickly from ice surface to prevent the temperature of ice affecting the thermometer.

14. Plant and Animal Life as Indicators of Pollution

A. Due to the increase in nutrients (phosphates and nitrates) in so-called polluted water there should be an increase in the following types of

In-Camp - Continued

plant and animal life:

1. Algae of all types
2. Protoza (especially pa-mecia)
3. Cyclops
4. Bullheads

If the oxygen content is too low then the cyclops and bullheads may appear in very small numbers or not at all.

B. Obtain samples of water and bottom debris from marsh, boat bay and lake. Examine by microscope a drop or two of each sample. Look for algae, protozoa and cyclops (see Pond Life, a Golden Nature Guide for pictures and description of these).

Bullheads will probably not be found in ice covered waters.

Post-Camp

1. Divide the class into committees of 4 or 5 students. Have them choose topics from which bulletin board displays can be made. Some of the topics might be:

   a. Food chain in the marsh.

   b. Plants of the marsh.

   c. Birds of the marsh.

   d. Plant succession.

   e. Microscopic life in the marsh.

   f. Plant adaptions to marshland environment.

   Students can sketch what they have seen and arrange these sketches in an interesting fashion.

2. Set up a small marshland ecosystem in a terrarium by providing it with humus soil, plenty of water and some of the typical small plants and animals found in the marshland: bedstraw, sedge grass, and algae for the plants; a frog or salamander with earthworms for the animals. Discussion of the incompleteness of this artificial marsh should reveal the students' understanding of the marshland ecosystem.

GEOLOGY

Major Objectives

1. Students should be able to identify at least two examples of the three major types of rocks. A list of these is as follows:

Igneous Type		Sedimentary Type
Granite	Instrusive	Sandstone
Gabbro		Shale
		Limestone
Basalt	Extrusive	Flint or chert
Obsidian		

Metamorphic Type

Quartzite
Slate
Marble
Gneiss (pronounced NICE)

2. Students should be able to identify these (3) three minerals that may be found in rocks:

a. quartz
b. feldspar
c. mica

3. Students should be familiar with the three main ways in which rocks are formed: by heat, sediment, and pressure.

4. Students should be familiar with the way in which rocks are broken down into smaller particles: wind, freezing and thawing, water movement, ice movement, plant growth, and man.

5. Students should be familiar with the ways glaciers change the surface of the earth.

Geology (Topography, Rocks and Minerals, Soil)

Discovery Questions

1. What are the outstanding (most noticable) land features of the camp area?

2. What appears to be the height of the highest hill in the area?

3. Can you find steep slopes in the area?

4. Are the hills sharply peaked or are they rounded off on the top?

5. Examine a topographical map of the area and see if you can read the contour lines and match them with your observations.

6. Find a place near the top of a hill where there is little vegetation. Is there any rock exposed? What kind of rock is it?

7. Examine the soil on the top of a hill. What does it look like? Look at it through a magnifier. Is the soil made up of dead plant life, pieces of rock, or a mixture of these?

8. Examine the soil near the lake. What does it contain?

9. Examine the soil in various places in the camp area. Are all the soils of the same material?

10. Do all of the soils hold the same amount of water?

11. Are all of the soils made up of acid producing materials or alkiline producing materials?

12. Do all of the soils keep a ball shape when you wet them and squeeze them in your hand?

13. Look at some sand under a microscope or hand lens. What do the individual grains of sand look like? Are they smooth or rough? Are they shiny or dull?

14. Collect several samples of the rocks that can be found lying around the camp area. Can you identify them?

15. Collect some of the rocks from the shoreline. Are these rough or smooth?

GEOLOGY

Background information

As recently as 10,000 years ago the greater part of Wisconsin and Illinois were covered by a glacier. As with all continental glaciers, the buildup of snow from year to year caused by the heavy snowfall and minimum melting in the summer created such a heavy mass that the snow near the bottom of the mass recrystallized into glacial ice which acted like ball bearings. This ice was squeezed out around the edges much as a ball of hamberger does when pressed into a patty.

This action along with the weathering forces of wind, freezing and thawing, flowing water, and gravity scoured the earth under the heavy glacial ice. Some of the till (smaller pieces of rock) was frozen in the ice while much of it was pushed ahead of the advancing edge of the ice mass.

When the edge of the ice mass reached a zone where the temperature was high enough to melt the ice as fast as the edge advanced, the till carried by the glacier was deposited in a ridge known as a terminal moraine.

As the temperature increased the glacier melted back further and further dumping the rocks it carried frozen in its ice. This material is given the name of ground moraine and is characterized by generally flat land dotted with knolls and valleys of small height and depth. Occasionally a crack would develop in the glacial ice and the melt water would run into the crack to the ground carrying with it the finer sand and gravel of the glacial till. This material was deposited on the ground under the glacier in long cigar shaped ridges called drumlins. A number of these can be seen along the Fox River in Waukesha County just north of Lake Beulah.

Camp Edwards lies within a region of Southern Wisconsin that was covered by the Lake Michigan Lobe of the Wisconsin stage of the North American Continental glacier. Much of the underlying rock material is glacial till deposited as ground moraine. This till consists of rock that was torn away from its place of origin further north and deposited in this area by the melting glacier. (See map on page 61.)

Lake Beulah itself may have been formed as a result of the damming up of a natural water runoff area by this glacial till. The water of the lake is supplied by many springs that are the result of ground water flowing through deposits of the sand of gravel of the glacial material.

Because of the mixture of rock and mineral material carried by the glacier, a great variety of rocks can be found at the camp, especially in the shallow waters of the lake.

Among the rocks that will be found here are the igneous rocks formed from the molten material lying deep in the earth. Through cracks in the crust the molten rock has seeped upward, cooled and hardened into various combinations of minerals with various crystal sizes and shapes.

Of the igneous rocks thatwere cooled <u>slowly</u> just beneath the crust of the surface, granite is the most common. Crystals of quartz (a mineral made up of the elements of silicon and oxygen), mica (a mineral made of potassium, alumininum, silicon and oxygen), and feldspar (a mineral made of potassium, sodium, or calcium, silicon and oxygen in a different ratio than mica) were formed slowly and grew to sizes that are visible with the naked eye or low magnification. Gabbro is less common and contains visible crystals of feldspar and the mineral, pyroxine, with very little quartz and mica present.

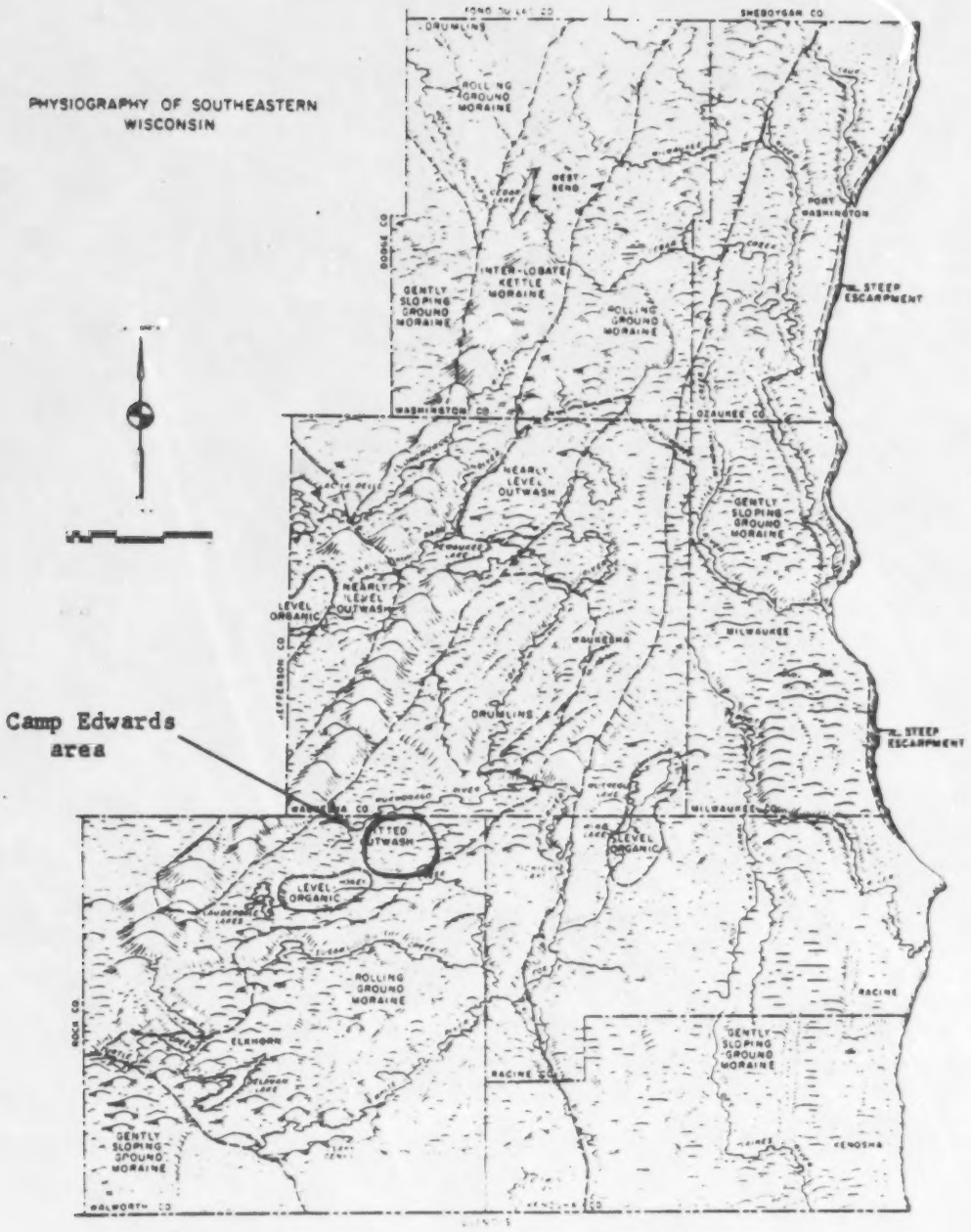
The igneous rocks that were formed when the molten rock mass came to the surface (called extrusive) cooled <u>rapidly</u> and formed very small crystals such as those found in basalt. Some cooled so rapidly that they have a glassy appearance such as that of obsidian.

Nearly all types of sedimentary rocks may be found in glacial till: sandstone, limestone, shale, and flint. Among these limestone and shale are fossil bearing rocks.

Many metamorphic rocks can be found in glacial till especially slate, gneiss (pronounced NICE), and quartzite.

The bedrock of this region is primarily dolimite, a type of limestone, which probably was laid down during the time when the Great Lakes covered a greater part of the northcentral states.

The soil of the camp area is of two types, sandy loam and marsh. The sandy loam is dark soil rich in minerals lying over sand and gravel subsoil which provides excellent drainage of water. The marsh soil is dark humus made of decayed plant material and has little mineral content and poor drainage ability.



The physiography of the Region has been entirely controlled by glaciation. The Interlobate Kettle Moraine acts as the focal area for ground moraines and outwash deposits throughout.

GEOLOGY

Activities

Pre-camp

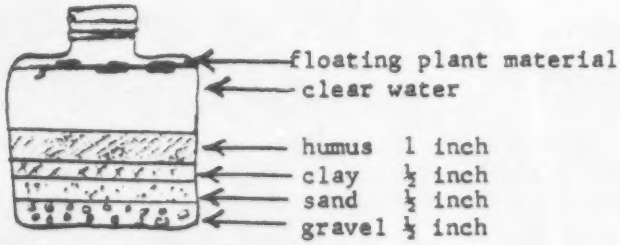
1. Have the students bring in rock samples from around their homes. Using a field guide to rocks and minerals (see Appendix), a hammer to expose the inner surface, and a hand lens, make a study of the crystalline shapes, sizes, and colors in these samples. Classify the rocks according to the types of crystals found in them. Egg cartons can be used as a more permanent storage box.

2. If possible, have several students collect stones from a river or stream. Have the students look for striations (scratches that run parallel to one another), and smoothed surfaces which indicate glacial and water action on the rocks.

3. Have students observe through a microscope or hand lens the various types of crystals in a sample of sand. Drawings may help them remember these shapes.

In-camp

1. Collect several soil samples from various places in camp. Place each sample in a bottle with a cap on it. When the group returns to the lodge, each bottle should be filled with water, shaken to agitate the soil, and then let alone to settle. As it settles the soil will separate into its components by weight. Have students draw pictures showing the relative amounts of each component. An <u>example</u> might be:



In-Camp - Continued

2. Have each student in the group collect 5 different stones in the shallow water along the lake front. With the rock hammer, break each open to expose the unpolished inner surface of the rock. Examine samples for:

a. crystal shapes
b. crystal sizes
c. crystal color
d. variety of crystals
e. layering of crystals

Using masking tape, mark each different sample with student's tentative identification and where it was found.

Do the same in other areas of the camp.

3. If a large boulder can be found exposed, a close inspection can be made to determine the various causes of weathering on it. If it is dolimite (limestone) it is probably bedrock, but if it is not, it is most likely an erratic which is a large boulder carried down by the glacier and deposited here. Glacial till later covered it.

4. Have the group make a rough map of the camp area showing elevation (as they would guess them to be or by using some mathematics) above lake level. Some students might wish to investigate the procedures needed to make a topographic map of the area.

5. Look for areas of erosion due to water, wind, or gravity (rock slides, mud slides). Consider the reasons for the erosion, what might be the consequences if it continues unchecked, and what could be done to stop it.

6. With litmus paper, test barious soils for acid content. Wet the soil sample and place a piece of blue litmus in it for a few seconds. If the litmus turns pink then the soil is acid. To test for alkalinity, use red litmus paper which should turn blue if the soil is alkaline.

7. See pages 65 to 67 for an activity on using topographic maps.

Post-Camp

1. Make a large map of the camp area showing elevations, soil make-up, soil

Post-Camp - Continued

condition (acid or alkaline, well drained or poorly drained, etc.), rock types and where they were found.

2. Read about the Wisconsin lobe of the Laurentide Ice Mass in a reference book.

3. Write to the Illinois State Geological Survey, Springfield, Illinois, for further information about: glaciation, bedrock formations, soil composition, mineral deposits, etc.

Determining the Results

1. In a walk around the school yard, have the students determine areas that show evidence of:

a. erosion
b. weathering (include building stones and sidewalks)
c. loam soil
d. good drainage

2. List several ground features and have the students determine their probably causes:

a. low rolling hills (drumlins-glacial)
b. gravel pits (glacial)
c. crumbling rocks (weathering)
d. gullies in a corn field (erosion)
e. smooth rounded stones (river tumbled)

3. Set up a series of numbered rock samples. Have the students determine the way in which these rocks may have been formed: igneous, sedimentary, or metamorphic. Have them indicate one clue that helps them tell how they were formed.

The more interested students (rock hounds) may be given the opportunity to tell what type of rock each sample represents: limestone, granite, sandstone, basalt, etc.

Reading the Land

Countour Maps

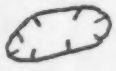
Materials: Large "topo" Map, E. Troy Quad. and Small "topo" Maps of Camp

Teacher Information

Contour maps are visual representations of the topography of the land and are general called topographic maps.

Each contour line represents a rise (or lowering) of 10 feet above the preceeding line or major surface feature such as a lake or marsh.

There are several ways to learn how to read a contour or topographic map. The best way is to start with the more recognizable features: lake, marsh, shoreline, etc.

The next step is to find sharp or steep rises in the land and look for those features on the map, then look for depressions in the land (pictured like this: 

Some student exercises might be:

I. Comparing altitudes - Lake and Marsh

On the map find the marsh that borders camp on the Southwest. Note the marsh's altitude above sea level.

Color the marsh brown.

Find the lake that borders the camp on the north. Note the lake's altitude above sea level.

How much difference is there in altitude between the marsh and the lake?

Which body is higher, the marsh or the lake?

Which way do you think the water flows?

a. from lake to marsh.
b. from marsh to lake.

Do you think the water will drain off rapidly or slowly? Why?

II. Finding a steep slope.

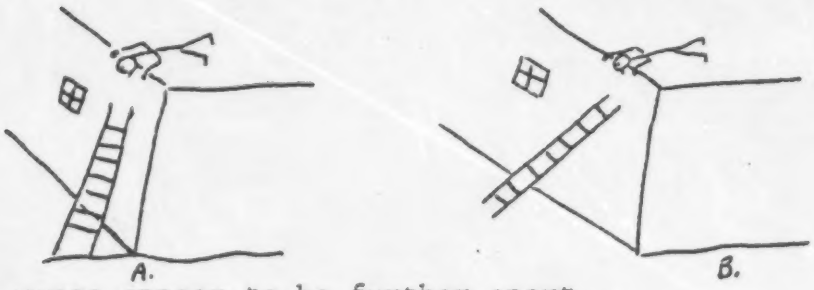
Find a steep slope along the lake side of camp. Find the approximate point on the map.

Note that the steep slope has contour lines that are close together.

This can be simulated by looking down a ladder.

If the ladder is standing nearly straight up and down, (see illustration A) the rungs of the ladder appear to be very close to one another.

If the ladder is tipped at a greater angle from the building (see illustration B) the



rungs appear to be further apart.

Find the steepest hill in camp and tell why you think it is the steepest.

Is there a way that you can think of to measure the steepness of the actual hill?

III. Finding the highest point in camp.

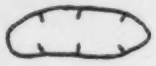
Look at your topographic map, find a hill that you think is the highest in camp. Tell why you think it is the tallest.

Go to the top of that hill on camp grounds. Look around. Do you see any hills higher? Are they on camp grounds?

Are you the winner? If so, you are a good map reader.

IV. Finding a depression by using a topographic map.

Look on your map for a depression. It will be shown this way:



Walk to that place on the camp grounds. How deep is the depression compared to the land immediately around it?

How would the depression be shown on the map if it were 20 feet deeper than the surrounding land?

Now that you have learned to read a topographic map, here are some problems to solve:

1. How far above the lake's surface is the lodge floor?
2. Where is there a "dip" of 10 feet in the camp road? (a "dip" means this)
3. Find the toboggan run on your map.
4. What part of camp would be flooded if the lake (and marsh) had ten (10) more feet of water in it? Color that part blue on your map.
5. How far above the parking lot are the pine trees on Indian Hill?

Lake Beulah – 809 Ft. –
Camp Edwards Lodge
Boat Dock
Park Lot
930
810
Runge Lodge
MARSH – 809 Ft. –
Pines
820 Ft
930 Ft
Contour Line Interval 10 Ft.
Scale 1" = 610 Ft.
N
Army Lake
82
83

WINTER SURVIVAL IDEAS

Although most school staffs opt to attend camp during the fall or spring months, the winter months offer a different insight into the nature of life in the out-of-doors.

Snow, protection from cold winds, food gathering, fire building and other survival techniques, can be used very successfully during these months. Here are some ideas you may want to use:

Pre-Camp Activities

1. Read about the Eskimoes and their clothing, food and shelter. Plan shelters you might build at camp from snow.
2. Discuss wind chill factor and heat loss. Relate this to food requirements for heat generation in the body.

In-Camp Activities

1. Shelter
   - A. Discuss the reasons for finding adequate shelter during winter:
     1. Wind-chill factor and its effect on exposed flesh.
     2. Loss of heat due to poor insulation.
   - B. Some types of shelters.
     1. Snow cave or igloo (if snow is available).
     2. Lean-to made of available materials (do not cut live branches from trees and shrubs).
        - a. Which direction should the opening of a lean-to face? Why?
     3. Dense woods area - Try the pines area east of main camp.
2. Food
   - A. Discuss the need of the body to have fats and carbohydrates to serve as fuel for maintaining body heat.

In-Camp - Continued

B. Kinds of natural foods:

1. Nuts - acorns, hickory nuts, hazelnuts
2. Seeds - grasses, corn
3. Greens - found under leaf and snow cover
   a. dandelions
   b. yarrow
   c. scallion (wild onion)
4. Crab apples - on trees yet or on the ground
5. Game - fish through ice using larva found in hollow stems of milkweed.

   Small mammals can be trapped if necessary, but I would suggest only a discussion of ways of trapping, such as snares be considered.

   Tracking might offer clues as to where to set traps.

3. Fire Building

A. Build a fireplace with rocks for safety of surrounding area.

B. Use no living (green) wood unless absolutely necessary.

C. Starting a fire - a good survival kit would include dry matches, but there may be other ways of starting a fire.

1. Friction

The bow string is wrapped around the stick once. As one moves the bow back and forth, the stick spins. Friction where the block and stick meet should produce enough heat to get a spark going. This is transferred to the tinder and fanned to get tinder started.

In-Camp - Continued

2. Flint and steel - Find some flint or chert, strike it against a steel knife blade to obtain a spark. If a piece of charred cloth is available, try to get a spark to land on the cloth. By fanning this spark, the cloth should glow. Transfer this to tinder.

4. Survival Kit

A. String or monofilament line - 25 feet.

B. Fish hook (1 or 2).

C. Matches (book) wrapped in foil or plastic as water-proofing.

D. Halozone tablets for purifying water if it can't be boiled.

ASTRONOMY

Astronomy study during the camping session is always an "iffy" situation because it requires a clear night (or day).

The camp now has two permanent installations which are essential to this study: (1) a telescope mount permanently fixed at a point on the athletic field to provide the best possible viewing of the stars and planets; (2) a 4" reflecting telescope which is stored in the camp office and can be mounted easily on the permanent mount.

Anyone planning to use the telescope at camp must first contact Mr. Don Tuttle at the U-46 Planetarium for a lesson in its use.

Here are some ideas for the study of the stars and planets.

Pre-Camp Activities

1. Familiarize students with the polar constellations: Ursa Major (Big Dipper), Draco (the dragon), Cassiopeia, Cepheus and Polaris (the North Star).

This can be done by using the filmstrips "Starry Universe" (EPS FS-11-H-08) or "Constellations" (EPS FS-04-A-01), the projectual "Star and Constellation Recognition" or the film "Constellations, Guides to Night Skies" (Kane 1499).

2. Have students make punch out models of some common constellations using shoe boxes or oatmeal boxes. A flashlight placed in the box will light up the punched out holes and make the constellations visible in a darkened room.

3. Have students read about galaxies, planets, nebulae, star clusters and twin stars, and consult a star chart for the month they will be attending camp to determine which of these will be visible during their camp stay. The "Star Gazer" (a monthly newsletter from the U-46 Planetarium) contains this information.

In-Camp Activities

1. Assign one constellation that you know will be visible to each student and have them find it and point it out to the others.

2. Train telescope on a nebulae, a planet, a twin star, a star cluster or other objects. Let each student view the object and then make a drawing of what they have seen.

3. Take a compass with you to a good viewing area (the athletic field). Locate Polaris (North Star) and check the compass for magnetic north. Note a difference.

Post-Camp Activities

1. Have students look up some of the myths of the constellations such as Orion, the Big Bear, the Dragon, etc.

Oral reports to the class would help share this information with others.

2. Have students make up their own myths about the Big Dipper, Cassiopeia, or their own constellation.

LANGUAGE ARTS OBJECTIVES IN OUTDOOR EDUCATION

1. To build a good vocabulary of words, especially in the fields of natural and physical science, geography, and Indian culture.

2. To encourage and develop the skill of collecting and recording scientific data into an understandable and usable format.

3. To develop and encourage the skill of listening to the sounds of nature which give clues to the existence of unseen natural phenomenom.

4. To have children discover that there are other methods of "reading" for gathering information while in a natural environment.

5. To encourage children to express themselves orally through the use of "story-telling" around the campfire and in the cabins.

6. To encourage children to feel the need to express themselves about nature and folk history through the vehicle of creative writing.

7. To develop an aesthetic appreciation for nature through the use of various materials in the creative arts - music, poetry, prose, art works, etc.

8. To show the contribution that different cultures have made to our own culture through the use of place and object names, ethnic related foods and methods of food preparation, farming practices, etc.

9. To encourage the use of creative written expression by use of a camp newspaper, letters and postcards sent home, stories and essays about camp experiences.

10. To encourage creative expression through the use of dramatizations of events at camp, cultural history of the area visited, and Indian lore.

11. To give children an idea of how manners can make things work more smoothly in a group situation.

LANGUAGE ARTS - BACKGROUND MATERIAL

Sixth graders are of an age that they enjoy some of the stories of the Indian days in the area of Camp Edwards. There are a number of pieces of literature about the Indians of the area, or at least of an area near by. Hiawatha is the best known of these. Of course, Hiawatha, was from much farther north, but at night, standing on the lake shore, it is not hard to imagine a canoe with some of our noble savages gliding past in the moonlight.

The stories of Paul Bunyan are tall-tale yarns about the adventures of a lumberjack of the North Woods that children enjoy hearing about. The Liar's Club of Burlington, Wisconsin continues that type of tall-tale set by the Paul Bunyan stories.

The use of campfire stories by adults can be turned over to some of the children - some of them tell a story much better than most adults - they are not hampered by bashfulness in acting out the parts with the emphasis they need, being the "hams" that they by nature are. Ghost stories of the milder type are allowable in cabins after the lights are out if they are not too disturbing to the children. This is where the skill of the counselor comes to play.

Keeping a diary or journal by those children who really want to do so is a good way to collect happenings for possible future publication in a special edition of a school or class newspaper to go home to parents.

Preparation for letter, or more likely, postcard writing is a must before the trip to camp. Parents and the other children in the family appreciate the receipt of letters or postcards, even if the child arrives back home before the mail, as is the case so often. It should be emphasized to the children that a postcard, with its limited space, must have

the whole message carefully thought out and organized properly before any writing takes place.

The methods of taking notes should be reviewed with the children before they leave for camp. The notes should be short, succinct, and not be so copious that they interfere with the actual listening and observing which should be done in the field.

Some of the terms used in reading maps and glacial terms, etc., should be included for vocabulary development before attending camp. A list of these terms accompanies this section, but it is by no means complete, and should have added to it those words that the teacher runs upon in her teaching experiences.

The review of proper table setting and table manners would be a good idea before taking children to camp. Some of these are reviewed in the section about table behavior.

Emphasis in the use of all the senses in "reading"about nature is a good practice in a pre-camp activity. Too often classroom teachers all they know about learning, and concentrate too much on the traditional reading and listening skills, only. Children can "see" the presence of mint, in the dark, by its smell and tell about an oak tree from the taste of its acorn as well as read a description or see a picture or listen to another person describe it.

QUESTIONS IN THE LANGUAGE ARTS

1. What are some of the new words that you have learned that have given you some wonder?

2. Does the presentation of some of the subjects at camp make you want to write to some organization for more information?

3. Do you think that story-telling around a campfire serves a useful purpose? Is it a skill that you would like to acquire?

4. Would you like to really learn a story to tell around the campfire?

5. Could you make up a story about the Indians who lived here long ago?

6. Where would you look to find out more about the area in which the camp is located to do further study in the various areas?

7. We have written history of many areas of the country, including this one. How do you suppose the Indians kept their history in this area? Did any other tribes of Indians do it differently?

8. Are there any descriptive words that you would apply to some of the things that you have seen, heard, felt, or smelled that you could apply to give the impression you received to someone else who hadn't been on this same trip?

9. How has your vocabulary increased since you have been in camp?

10. Because of your experience in camp, do you see any reasons for having a set of rules for manners?

11. Have you had a feeling during any of your experiences in camp, that you might wish you were talented enough to write a song, a poem, make up a story to read or tell, paint a picture, or at least a sketch, or compose a musical piece?

12. Would you be interested in reading a story or poem, see a painting, or hear a piece by a person who was impressed by one of nature's wonders?

13. Would a newspaper, written by the class, be a good way to inform other students, parents, and others who did not attend camp a fair idea of what went on at camp?

14. Would you be interested in making up a skit or play about the early days of this area?

15. Would keeping track in written form of events taking place at camp be of use to you in the future? How would you go about doing this?

16. Have you noticed any words used in camp that have spellings based on a different set of rules than those with which you are familiar?

17. Have you noticed that some of the Indian lore explanations for certain happenings vary in telling? How do you account for this? How would you improve in the manner of recording these events to prevent this from happening in the future?

ACTIVITIES IN THE LANGUAGE ARTS

1. Dramatic impressions of camp activities.
2. Poems growing out of outdoor education.
3. Reports on "What Camp Meant to Me" or "What I Learned at Camp."
4. Quiz games to test outdoor educaiion learnings.
5. Explanations of displays of materials collected at camp (rocks, minerals, beetle damage, etc.).
6. Spelling bee on new words learned in the outdoor education program.
7. Organizing and telling another class, in sequential order, about the outdoor education experience.
8. Learning to identify a bird by its distinctive call or song.
9. Keeping a camp diary.
10. Writing letters to organizations for information to be used at camp. (United States Weather Bureau, U.S. Forest Service, State Department of Conservation, etc.).
11. Writing a newspaper special edition related to outdoor education.
12. Vocabulary and spelling lists.
13. Preparing skits for presentation at campfire.
14. Dramatization of experiences of camp when back at school after the outdoor education experience.
15. Writing letters of appreciation after return to school to those people who helped make the outdoor education experience possible. (The camp director, superintendent of schools, board of education, student counselors, etc.)
16. Development of a dictionary of outdoor education terms.
17. Interviewing for a newspaper article some of the people involved in work connected with the out-of-doors and natural resources. Forest ranger, game warden, county agent, conservation worker, etc.

OUTDOOR EDUCATION VOCABULARY

Weather

relative
humidity
moisture
thermometer
psychrometer
prevailing
forecast
evaporation
condensation
anemometer
water cycle

Ecology

habitat
community
herbivore
carnivore
predator
parasite
scavenger
biology
laboratory
ecosystem
contaminate
hibernation
interdependence
reproduction
saprophyte
symbiosis

Geology

erosion
soil
profile
fault
vein
decompose
ore
bedrock
dike
schist
loam
humus
magma

Topography

elevation
mountain
mesa
ridge
divide
gully
countour
valley
watershed
knoll
hummock
dingle
rill
fault
profile
terrain

Forestry

wildings
seedlings
snag
cambium
sapwood
heartwood
timber
duff
slash
camouflage
chlorophyll
deciduous
evergreen
humus
litter
photosynthesis
pistil
stamen
parasite
pollen
transpiration
venom
specimen
fungi
vegetable

Equipment

Geiger counter
microscope
magnifying glass
compass
prism
planetarium
mortar
pestle
clinometer
protractor
binoculars
insect killing jars
insect nets
dip nets
insect cage
litmus paper
rock hammers
chisels
watch (as compass)
balance
psychrometer
wind vane
rain gauge
anemometer
barometer
maximum-minimum thermometer

Astronomy

telescope
observatory
museum
galaxy
constellation
heavens
planets
solar
satellite
comet
zenith
azimuth
constellation
rotation

Mineral

igneous
sedimentary
metamorphic
crystal
luster
scheelite
granite
alabaster
gypsum
limestone
basalt
quartz
clay
feldspar
gneiss
luminous
radioactive
pegmatite

SOCIAL STUDIES OBJECTIVES IN OUTDOOR EDUCATION

Major Objectives of Study in the Social Sciences:

1. To have children acquire a general knowledge of the history of the area.

2. To have children acquire a knowledge of the relationship of the physical geography to the customs, agriculture, and industry of the area.

3. To have children see a need for the establishment of rules, laws, etc. for the orderly progress of society.

4. To have children see a need for the proper ecological management of all aspects of their environment in order to avoid the repetition of more problems such as our present ones relating to pollution, destruction and extinction.

5. To have children become aware of the poor economics of a short-term approach to the solution of some of our problems involving our natural resources.

6. To have children acquire an appreciation of previous cultures in our land.

7. To have children acquire an awareness of the importance of an aesthetic appreciation of things in our natural environment.

8. To have children see the relation of symbols on a map to the actual terrain.

9. To have children see a relationship between the physical geography to our everyday life. (Transportation, communication, etc.)

SOCIAL STUDIES - BACKGROUND INFORMATION

The first white man came to Wisconsin in 1634. He was Jean Nicolet, a Frenchman, who landed at Green Bay. The Indians who lived in the area at this time were the Kickapoo, Miami, and Illinois tribes. These Indians lived in lodges of bark, saplings, and rushes. They fished and hunted and grew crops such as corn, beans, and squash.

Many French explorers and missionaries came to Wisconsin. Included among them were Louis Joliet, Father Jacques Marquette, and Robert Cavelier, Sieur de la Salle. They traveled long distances, usually with Indian guides, and used the larger birchbark canoes. Their routes were, of course, the waterways of the country and they had to make many portages from one body of water to another.

The English took over the area in 1763 under the terms of the Treaty of Paris and settlement of the lands began. The Indians gradually moved out, some of them west, and some around the southern tip of Lake Michigan into the present states of Indiana, Ohio, and Michigan. This was not all accomplished peacefully, but the last stand of the Indian in Wisconsin was at a battle near Wisconsin Rapids in 1832 when the Indian chief, Black Hawk was defeated by the army troops sent from Fort Dearborn who had chased him from the Illinois lands when he raided the settlements along the Rock River. He was sent, along with about one hundred fifty of his braves, to a reservation along the Des Moines River in Iowa.

The word "Wisconsin" comes from an Indian word, "Wees-Konsan" which, in the Chippewa language means "gathering of the waters". The French spelling was Ouisconsin. Because of the difficulty in translating from the Chippews to the French, to the English, the meanings are not always clear. Some scholars have also interpreted the wor "Wisconsin" as meaning, "wild rice country", or "home land".

The state of Wisconsin is called the "Badger State", and the people have been referred to as "Badgers". This is not because of the resemblance of the people to the animal nor the over-abundance of this animal in the state, although there are many badgers in Wisconsin, but it is in reference to the early miners of the lead ore produced in the region. These miners tunneled caves in the hillsides and used them for living quarters. The miners and their habits reminded people of badgers burrowing holes in the ground.

Wisconsin has more than 8000 lakes and many rivers. It is a natural playground for the midwest because of the abundance of bodies of water.

The chief products of the state of Wisconsin are: Manufacturing, automotive products, beer, food prodjcts, machines, especially electrical, metal products, paper and related products. Agricultural, beef cattle, hogs, cherries, corn, cranberries, dairy products, hay, honey, and oats. Mining, clay, lead, sand and gravel, stone, zinc.

Wisconsin has been rather progressive in many respects; her schools the first kindergarten in the nation was established by Mrs. Carl Shurz in Watertown in 1856; her public utilities - the first hydroelectric plant in the nation was built on the Fox River near Appleton in 1882; in social reform - minimum wage laws and mothers' pensions were established in 1913; workmen' compensation and teachers' pensions were established in 1911. her development of natural resources conservation; and the scientific management of agricultural crops were started before most areas.

Wisconsin has enjoyed the reputation as a "vacation state" due to her many natural attractions. Tourism is one of the important factors of her economy. The area around Camp Edwards abounds in vacation resorts and vacation homes. Some of these may be seen along the shores of Lake Beulah.

Camp Edwards is located in an area which has been covered by glaciers an estimated four times. This started about 1,900,000 years ago, and the last covering occured about 25,000 years ago. Most of the state of Wisconsin was covered by these heavy ice sheets, hence the abundance of residue left in the form of moraine material.

These glaciers changed the landscape by their enormous weight and scraping action on the surface of the earth. When the ice sheets melted and receded, they left great deposits of the earth's materials and many hills and valleys. The valleys filled up with the water from the melted ice and formed many lakes found in the state and also the much larger Great Lakes. Some of these large deposits of moraine material can be seen at the Kettle Moraine State Park, only a few miles from Camp Edwards.

QUESTIONS ON SOCIAL STUDIES

1. About how long will it take us to make the trip to camp?
2. What rivers will you see on the way? Lakes?
3. About how long would it take us to make the trip by airplane?
4. Which way is least expensive?
5. When might we want to fly there? From there?
6. What ways could the Indians have used to make this trip?
7. How did the Indians carry their trade goods?
8. Of what importance was water to these Indians?
9. How do we communicate with camp from school?
10. How could the Indians communicate this distance?
11. In what climatological area are we living and camping?
12. What is a watershed?
13. Can you see any evidence of erosion? What caused it?
14. Can you see any evidence of pollution? What caused it?
15. What kind of Indians lived in the area?
16. What did they do to get food?
17. What are the main industries of this area at present?
18. What methods of distributing the things produced by these industries will you see?
19. How has the physical geography of this area helped determine the type of agriculture and industry?
20. Are the campgrounds sandy, rocky, or would they be good lands to farm?
21. Would it be possible to live here for six months without buying anything?
22. What might you have to buy if you stayed here for a year?
23. What things do you see that remind you of state or federal governments?

24. How did the ancient peoples like the Greeks and Romans explain some of the natural phenomenom that you see at camp?

25. Do you see any reasons for the establishment of rules for living in a group situation such as we have at camp?

26. Could you draw a map of the camp, locating the main features in their approximate location?

27. Why did you dress as you did today? Whay part did the local climate have in your choice of clothing?

28. Why is the region like a city area?

29. What are the main products of this region?

30. What are the principal occupations of the people in the region?

31. How do the main products and the principal occupations of the region affect the interests and activities of the people?

32. What is one region in the United States that you consider to be greatly different in natural environment from our own area? How does the way of life there differ from our own? Why?

33. Where does the water we drink at camp come from?

34. Where does the used water go?

ACTIVITIES IN THE SOCIAL STUDIES

1. Locate Camp Edwards on a map before the trip and by use of the legend determine its distance from Elgin; estimate the time required to make the trip, and determine from a topographical map of the area, what type of terrain might be found at camp.

2. By use of a map, try to find water routes to Camp Edwards and locate possible portages which the Indians might have used.

3. When at camp, have children discover actual geographical features which have been determined from the map beforehand.

4. Observation of some of the Indian articles at camp and a study of the totem poles, with some guidance, will help children acquire some of the history of the area and the camp.

5. Observation on the bus trip on the way to camp would allow the children to get some idea of the industry, agriculture, and commercial business of the area.

6. Provide an opportunity for children to plan and present an Indian ceremonial.

7. Examination of the soil and topography first-hand will show children some of its suitability to farming.

8. Participation of children in making rules for the operation of their own individual cabins, with the guidance of the student counselors, could be permitted.

9. Alertness of observation while on a hike might point out evidences of human habitation in some of the wilder areas. (Cans, papers, etc.)

10. Night observation of the constellations will show how man can determine compass directions by use of natural means.

11. Day observations of shadows, mosses, etc. would demonstrate how man can use other means to determine directions.

12. Make an exhibit of events related to a tree's annual rings. Yarns connecting a picture of an event in history to a pin in an annual ring would demonstrate where in a tree's life that historical event took place.

13. Investigating the economic effects of storm damage by seeing trees felled by storms and buildings damaged by storms, power and telephone wires downed.

ARITHMETIC OBJECTIVES IN OUTDOOR EDUCATION

1. To help children gain an understanding of number concepts and relationships.
2. To help children develop a facility for the use of measuring instruments in relation to linear measure, space, height, temperature, barometric pressure, etc.
3. To give children an opportunity for the application skills to first hand experience in the outdoors.
4. To help children acquire a "feel" for estimation in using the various measurements.

BACKGROUND INFORMATION FOR TEACHERS

The number of opportunities for teaching some of the arithmetical concepts is almost infinite in the outdoors. Motivation is almost "built in." It is much easier to convince a sixth grade boy that the height of a tree is most important in determining the number of board feet of lumber it contains or how much room should be allowed if it were to be felled than to have him estimate the height of a building or the flagpole back at the school. The distance across a river or the drop-off in a lake make much more sense to him than an obviously artificial one created by the teacher only for the purpose of creating a story problem.

The use of "personal" standards of measure is always of interest to many children. If they know how many of their paces there are to a hundred yards, they will pace off distances everywhere on their own. If one knows that his foot has a length of exactly nine inches, he is able to do all sorts of measuring.

The making and using of instruments of measurement are of great interest to many children. The clinometer, for measuring the angle of elevation or declination, and the measuring wheel, for measuring the longer linear measurements are interesting devices for children.

The use of the appropriate types of units of measure are graphically illustrated in the outdoors. Children can easily see that the trip to camp cannot be practicably measured in inches, feet, or yards. They can see on the way to camp that area measure of the fields they pass are conducive to the larger units of area measure.

The use of topographic maps in arithmetic will give children many opportunities for comparisons. The problems created in comparing the depths of the lake to the height of one of the hills nearby or the height of the camp to the height above sea level of the school site make interesting contrasts.

Velocities of flowing streams or air currents can be an interesting project in measurement. Camp Edwards does not have a flowing stream readily available, but the wind blowing off the lake can present a realistic problem in measuring its velocity.

There are many other possibilities for the imaginative use of arithmetic in the outdoors which can be utilized by the creative teacher. It is hoped that these will be shared from time to time so that all may have the benefit of the techniques and special talents of others.

QUESTIONS IN ARITHMETIC

1. By use of the camp flag, how fast would you estimate the wind is blowing?

2. What would you say would characterize the climate during our stay in camp?

3. While standing in the doorway of your cabin, facing toward the outside, what compass direction would you be facing?

4. If you were doing the same as the above question at your own home, what compass direction would you be facing?

5. Without using such inexact terms as blocks, how far do you live from school? (Yards, miles or parts of a mile).

6. Could you make a rough map of the living area of the camp?

7. What nature indications would you use to determine the direction of the wind?

8. What procedure would you use in trying to determine the area of an irregular plot of land such as the property of Camp Edwards?

9. What is the distance of your own pace?

10. What is the height, from the ground, of your eyes?

11. How would you go about finding out how much it costs to feed lunch to one camper on a hobo dinner?

12. How many campers can the entire camp hold in the cabins?

13. How many people can be fed at the dining hall tables?

14. Estimate how far is it from the lodge to your cabin. (Shortest distance.)

15. How far is it from the lodge to the baseball field? (Estimate)

16. Could you make a map of your own yard at home and place all the objects in their approximate location? Your neighborhood?

SOME MATHEMATICS ACTIVITIES FOR OUTDOOR EDUCATION

Measurement:

a board foot
diameter and circumference of trees
distances for map making, scale drawings, or models
surface area for above
dimensions of camp buildings and their placement
percent of slope
distances in hiking
temperature
barometric pressure
speed of water flow

Estimating:

height of a tree, hill, building, totem pole, flag pole
time of day
distance hikes
distance away of lightning
using crickets as thermometers
width of lake or distance to an island or peninsula

Number Concepts:

census of a number of natural items in a given area; i.e., number of kinds of plant life in a square foot of earth's surface
census of aquatic animals in a given area through the use of seine
census of trees in a given area
measure and mark out an acre of land, with a child standing at each corner

Compass Hike:

a very short course just to demonstrate the reading of azimuths and distances

Checking Account:

depositing a given amount and writing checks for use at the Trading Post while keeping a running balance

Averaging:

temperature readings
barometric pressure readings
travel rates of ants

Geometry:

use of the Egyptian Triangle to determine a right triangle for determining the corners in the laying out of an acre plot. A rope knotted at 3, 4 and 5 foot intervals can be used to determine the 90 degree corners.

1. In making a trundle wheel (see page 95) you should have the students figure what the diameter of the wheel should be so the wheel will have a convenient circumference such as 1 yard or 1 metre.

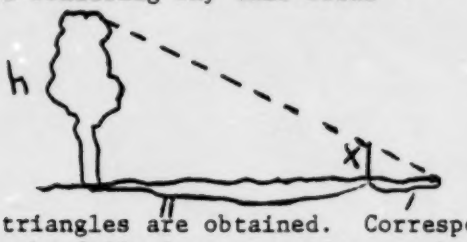
c = d	c = d
1 yd. (36 in.)=3.14 d	1 metre (100 cm)=3.14d
d = 11.5 inches	d = 31.8 cm

This will be a good time to use metric measures so I would make a wheel of 1 metre circumference as well as 1 yard. Decimeter and feet can be marked off also.

2. Find a stump. Count rings to determine age of tree.

3. Find the height of a tree using several methods.

   a. Use the 11 to 1 ratio described in the Outdoor Education Guide. In case you were wondering why this works -



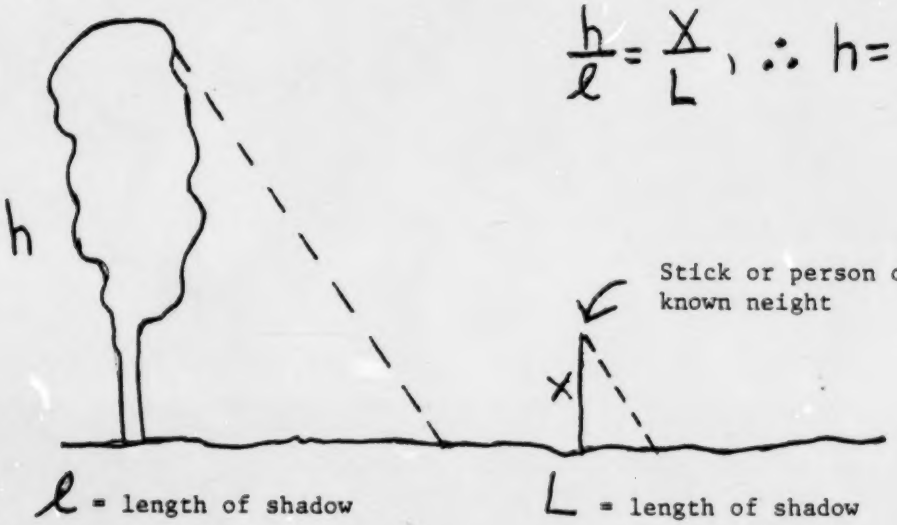
Two similar triangles are obtained. Corresponding sides are proportional so the following proportion can be obtained:

$\frac{h}{12} = \frac{x}{1}$ X is known because it can be measured.

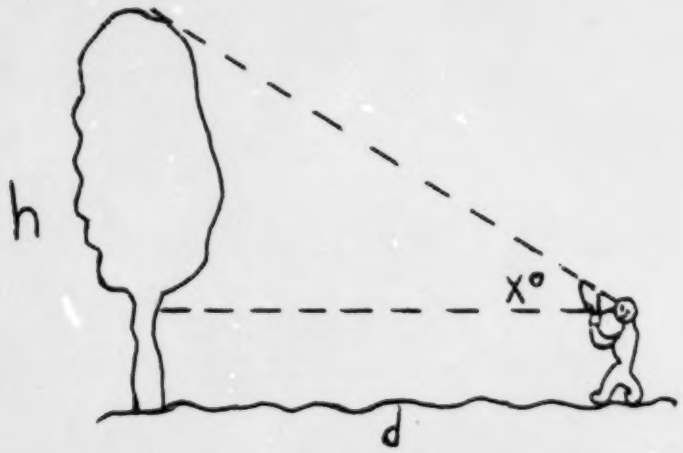
Since the ratio is 12:1, h will be 12 times X or will be the number of feet if X is in inches.

   b. Again using the ratio method and the use of shadows, you can find the height as follows:

$\frac{h}{\ell} = \frac{X}{L}, \therefore h = \frac{\ell x}{L}$



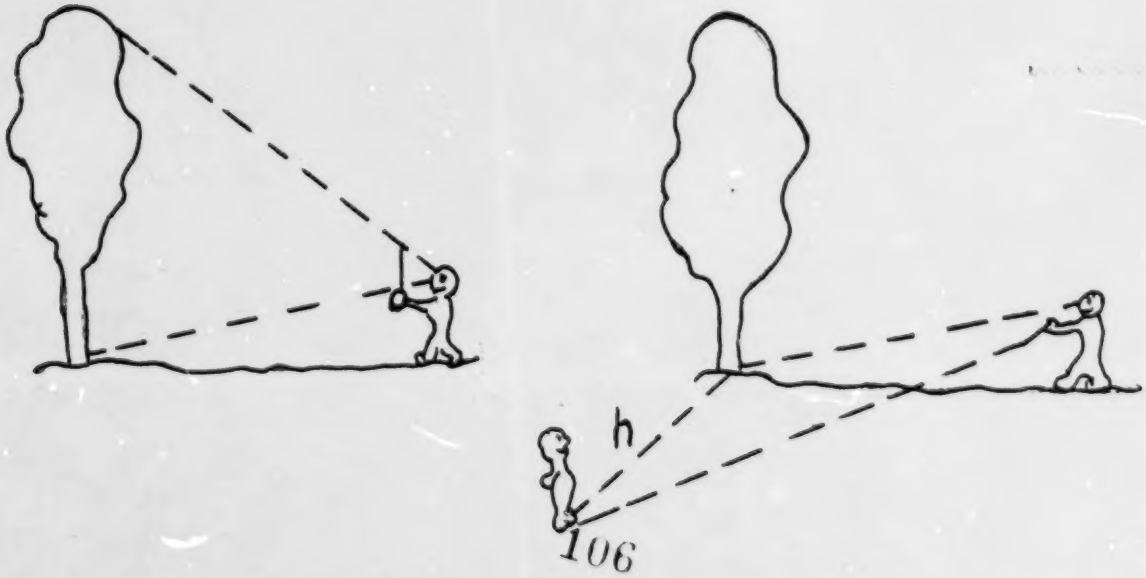
c. You can use the clinometer (see page 94 for design of clinometer) to find the height also:



Sight to the top of the tree and read the angle of elevation. Measure the distance from the person to the tree. Draw a scale drawing to then measure the height of the tree on the drawing. Use the scale to find the height in feet. Remember the height of the person to eye level must be taken into account.

d. A somewhat similar idea is to use the clinometer to sight to the top of the tree. The student keeps moving toward or away from the tree until the angle of elevation is exactly 45°. Then the height of the tree is the distance from the person to the tree <u>plus</u> the height of the person to eye level.

e. A crude method is to have a student use a stick held at arms length to sight the top and bottom of the tree. The stick is then turned horizontal and a second person is directed to move to a point where the sighting would be the same as the top of the tree. Height of the tree is the distance from the second person to the tree. See illustration.



MATHEMATICS ACTIVITIES - Continued

4. Read electric meter - figure amount of electricity used at various times of the day. Graph. Figure cost of electricity.

5. Draw a scale map of an area. Use squared manilla paper from stock.

6. Find length of pace. Mark off a straight 100 foot course. Have students walk and count paces. Divide to find length of pace.

7. Lay out baseball diamond or 4 square court. Use Egyptian knotted rope to get right angle.

8. Measure water temperature - compare to air temperature.

9. Use dry-wet bulb thermometer and chart to determine relative humidity.

10. Figure cost of feeding camp for a meal. Determine amount of meat, potatoes, etc. needed.

11. Use stop watch to measure distance sound travels (1100 feet per second). Have a student walk at least 1100 feet from the group but still within sight. Have him bang two boards together or cymbals over his head. Person with watch starts watch when he sees cymbals hit and stops it when he hears the noise. Find the distance.

13. Find the distance to camp. Time the trip. Find average speed. Find out how many gallons of gas are used. Figure miles per gallon.

14. Look for geometric shapes on way to camp. Silos, corn cribs, etc.

15. Set up a compass course for example.

Start:	Walk	30 paces	60°
	Then	30 paces	150°
	Then	30 paces	270°

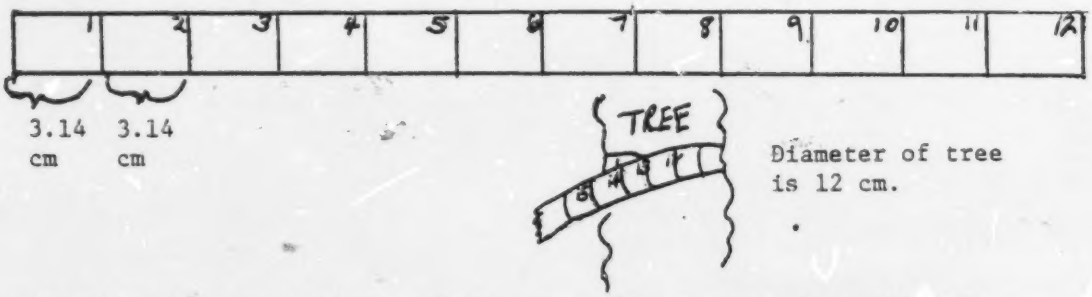
Should put you back at starting point.

16. Try to measure height of hills, depths of gulleys or ditches. Have children determine ways.

17. Have children estimate distances, heights, etc., then measure or pace them off to see who estimates best.

18. Figure an estimated number of bricks or blocks in the Kybo. Figure area of walls - count blocks in small area then figure total or count rows and number in each row, etc.

19. Find the diameter of various trees. Since the ratio of the diameter to the circumference is 3.14, make a tape marked off in units 3.14 inches or centimeters apart. Place tape around tree. Diameter will be the number of units.

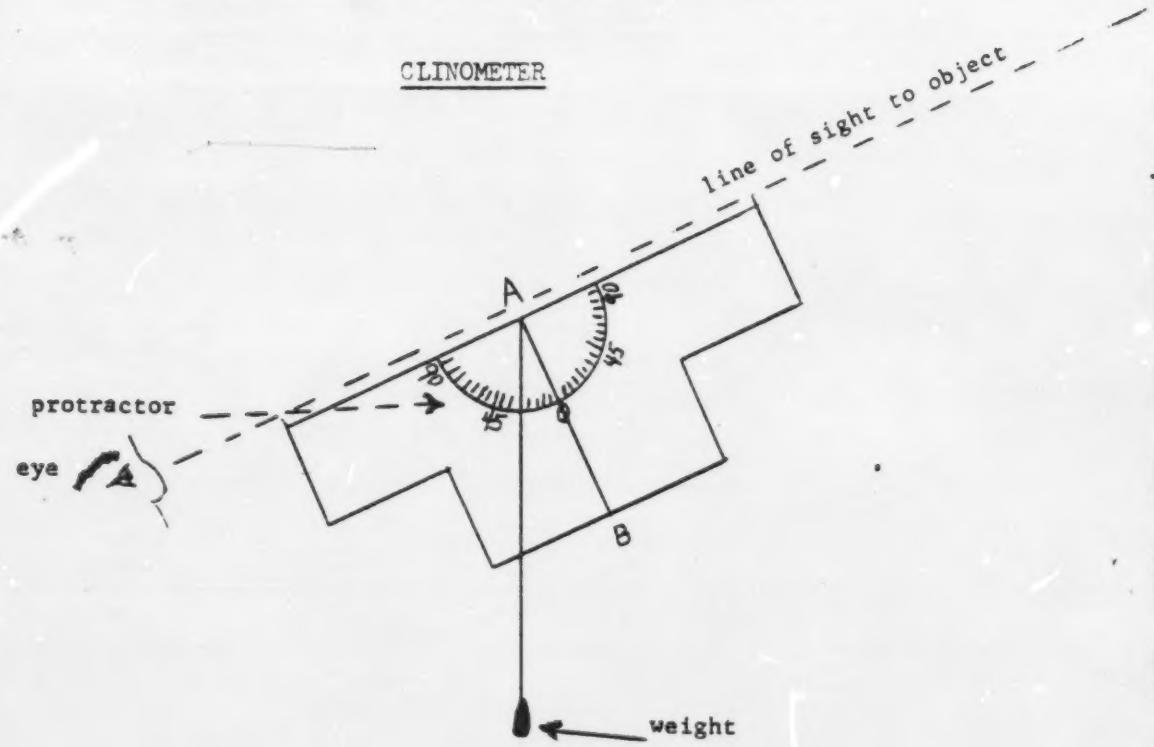


Diameter of tree is 12 cm.

20. Prior to going to camp, obtain a State map. Figure route bus will take - figure mileage of trip, etc.

21. Make a long pendulum, 15-20 feet long if possible. Carefully swing pendulum in North-South, arc. Check as time passes to see what happens to direction of swing. Why does the direction of swing change? Could this serve as a clock if the hours were marked on the ground below the pendulum?

CLINOMETER



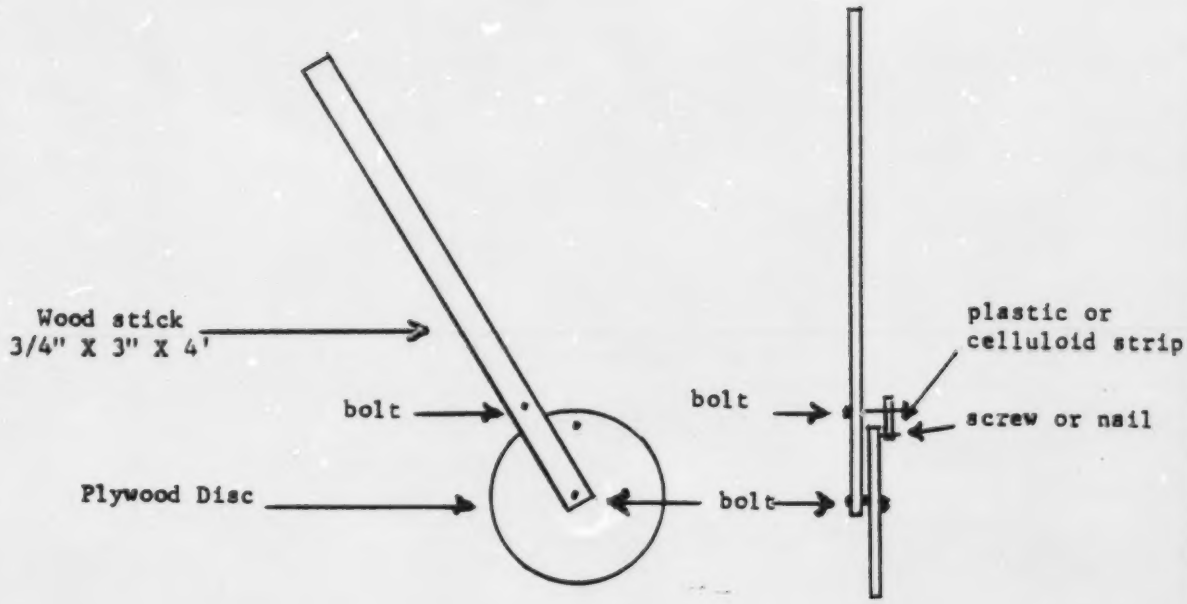
A clinometer is used to measure angles in a vertical plane - that is, commonly, angles measured between the horizontal and the position of some point above or below the level of the observer. The observer sights along the top edge of the clinometer and lines it up with a distant point. A second person then reads the number of degrees indicated by the clinometer as the angle of elevation (or of depression) of the point sighted.

A clinometer can be made by starting with a piece of wood having approximately these dimensions: thickness, 3/4 inch; width, 2 inches; and length, 1-foot strip. (See diagram)

Using a protractor and a pencil, draw a semicircle on the cardboard (see diagram) and mark off the semicircle in degrees in the manner illustrated. Insert a thumbtack at point A. The indicator line can be made by using a piece of thread with a paper clip at each end. Hanging one of the paper clips on the thumbtack permits the indicator (thread line) to swing freely. The other clip acts as a weight to keep the thread straight.

The angle of inclination (or depression) can be found by reading the number of degrees in the angle formed by the line AB and the indicator (thread line) - that is, by reading the number of degrees shown at the point where the thread crosses the semicircle.

MEASURING WHEEL



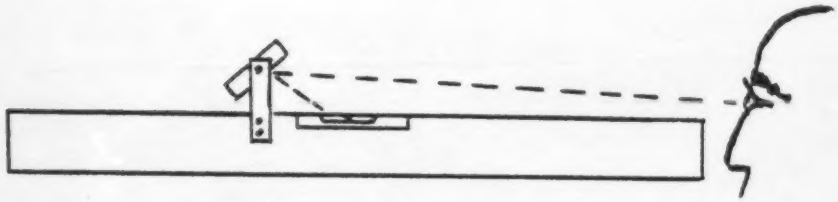
The measuring wheel is an arithmetic project than can be made by the students. One has to be sure that the circumference is exactly the distance you wish to measure in one revolution. A stick about four feet long and 3 inches by 3/4 of an inch serves as the handle. A sheet of outdoor plywood will serve as the wheel. If the wheel is one yard in circumference, each of the three feet should be marked on the rim. A bolt through the center of the circle and through the long stick will serve as an axle. If desired, another bolt through the handle and above the wheel, with a piece of celluloid clipped to it so that it hits a screw or nail projecting from the wheel will act as an audible counter as the wheel turns each revolution. The sixth grade boys should be left to figure out this device, as they use something of this sort on their bicycles to make a motor noise on the spokes of their bicycle wheels.

In using the measuring wheel, it is important that the user maintains a more or less straight course to insure a more accurate measurement. Any wandering from this straight course will make a measurement considerable longer than the actual measurement.

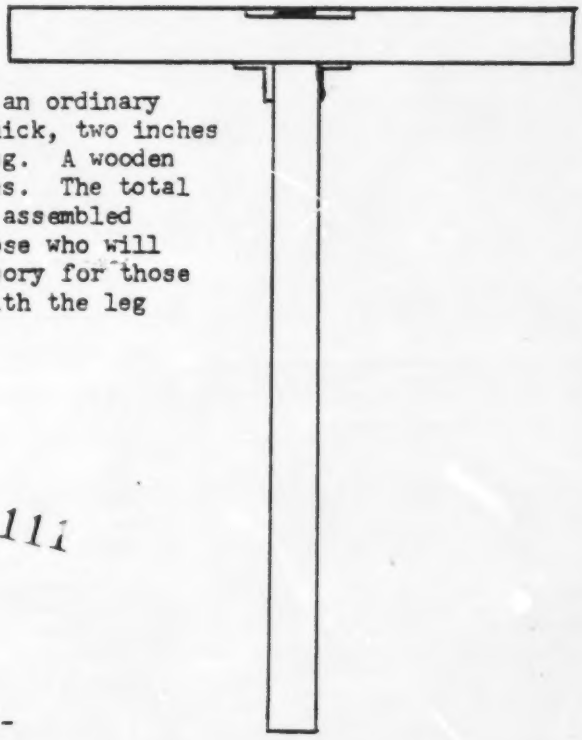
Another student should also walk along with the measurer to keep a double check of the count of the revolutions.

SIGHTING LEVEL

Any level would be suitable for the sighting level. However, an improvement can be made by attaching a small mirror to the level so that the person doing the sighting can see the bubble at the middle of the level. This mirror can be fastened at a 45 degree angle just above the bubble, but in such a manner that the person sighting can see under the mirror. Commercial sighting levels are available.



SURVEYOR'S LEVEL



To make a surveyor's level, fasten an ordinary level to one end of a board one inch thick, two inches wide, and perhaps four or five feet long. A wooden level can be fastened with corner braces. The total length of the board and the level when assembled should be determined by the size of those who will use the instrument. A practical accessory for those who are so talented would be a level with the leg of adjustable height.

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MUSIC OBJECTIVES IN OUTDOOR EDUCATION

1. To gain an appreciation of how different cultures have contributed to our own body of music.

2. To help children realize how some music can, by tempo and lyrics, help to ease the burden of work.

3. To help children recognize how sounds in nature may be interpreted by instrumental and vocal reproduction.

4. To show children how some musical instruments evolved from simpler instruments made from entirely natural materials.

5. To have children gain a sense of comraderie through the use of songs.

ACTIVITIES IN MUSIC

1. Make a musical instrument from idigenous materials. (Whistle, flute, etc.)

2. Learn some of the folk songs that are traditional which can be used for the rest of one's life. (Erie Canal, Happy Wanderer, Jacob's Ladder, Kumbya, Allouette, Down in the Valley, Home on the Range, I've Been Working on the Railroad, Kookaburra, Now the Day is Over, Rock-a-my Soul, Tell me Why, White Coral Bells, Zulu Warrior, etc.)

3. Let some children learn a song at school before the camp experience and teach it to the entire group at camp. (It must be carefully chosen and fully learned to try this.)

4. Use ukulele or guitar to accompany the singing. There is almost always a student counselor who is proficient enough to play if there are no teachers who can play. Some of the children are quite good enough to do this also.

5. Have children listen for rhythm in the sounds of nature - the wind brushing branches together, water sounds such as waves are rhythmic in their pattern. The pecking sound of some birds, and the chirp of a cicada is rhythmic, rising to a crescendo and then diminishing away.

6. Learn the patriotic songs, at least two verses, by memory. One would expect everyone to know "American, the Beautiful", "Star-Spangled Banner" "Columbia, the Gem of the Ocean", "America", and others.

SCHOOL DISTRICT U-46
RESIDENT OUTDOOR EDUCATION

FOLLOW-UP SUGGESTIONS

After Camp Comes:

1. The job of further evaluation to parents. (A survey sheet; a classroom newspaper; a letter home by the teacher or students, or both.

2. The experience of using camp logs in the classroom for writing reference material; sending the logs home or retaining them in the classroom; putting them on school bulletin boards, etc.

3. Thank you notes to those people who have made the trip possible and interesting: The School Board, the Superintendent, the Director of Elementary Education, student teachers, parents, bus drivers, Conservation men, camp staff, others.

4. Dramatization of some of the experiences at camp for the other rooms, assemblies, P.T.A. groups, others.

5. An increased interest in general science and the world in which we live. The teacher may want to follow-up the school camping experience with additional science movies or slides. The class may have their science museum filled with samples brought home from camp. There may be some books from the library they could consult for more information.

6. The students further desire to consult the location and direction of camp on the map. It may be important to know the number of miles and amount of gas and oil needed for the trip. They may have become more interested in historical landmarks, and the historical background of camp.

7. Note to the Teacher:
   After camp, there should be a noticable change in the individuals of the room or as a whole group.
   You may see changes in attitudes, citizenship, group cooperation, and group feeling toward you and others in the group.

These are but a few ideas for follow-up. You and your class will have many others based naturally on the kinds of experiences you had while at the field campus.

APPENDIX TO
CURRICULUM GUIDE
OUTDOOR EDUCATION

LIFE LIST

ANIMALS

One way to systematically keep track of the animals and identify them is to keep a life list. Here you may list the animals or their signs and, if not able to immediately identify them on the spot, put some information about them and identify them later.

DATE	ANIMAL	DESCRIPTION	WHERE SEEN	TYPE OF HABITAT	SIGN (Scat, food, etc.)	NEST OR DEN

OUTDOOR EDUCATION

CHECK LIST

WILD FLOWERS

Common Name	Flower Description Color, No. of Petals, etc.	Leaf Description Kind and Arrangement

THE FLESH EATERS

The Day Shift

The Night Shift

Name them

with narrow wings, long tails	HAWKS Robin size --- SPARROW HAWK	1.
	Crow size --- DUCK HAWK	2.
with broad wings, long tails	smaller, with square-tipped tail SHARP-SHINNED HAWK	3.
	larger, with round-tipped tail COOPER'S HAWK	4.
with broad wings, broad tails	barred tail, white spot under wing RED-SHOULDERED HAWK	5.
	no bars or one-RED-TAILED HAWK	6.
with ear tufts, yellow eyes	OWLS Crow size-with ear tufts close together--LONG-EARED OWL	7.
	smaller -------SCREECH OWL	8.
	larger-2 ft. long GREAT-HORNED OWL	9.
without ear tufts	with heart-shaped face--BARN OWL	10.
	with cross-wise bars on breast BARRED OWL	11.

ANIMAL SIGNS

All animals leave signs, intentional or unintentional that they are in a particular place or have been in that particular place. The observant person, that is, the quiet and searching person, will often be able to detect these signs and discover the presence of wildlife that most others miss completely.

1. Dens, Nests, Burrows:

   Holes in the ground--salamander, toad, lizards, birds, turtles, snakes, chipmunks, moles, mice, rats, gophers, ground squirrels, fox, mink, weasels

   Holes in trees--bear, raccoons, porcupines, opossums, mice, birds, woodduck.

   Homes on trees or shrubs--birds, squirrels, mice

   Fish nests - redds of swept gravel, holes in banks or bottom

   Nests on the ground--birds, lizards, snakes, alligators, turtles, mice, rats, rabbits, deer, elk, antelope

2. Tracks, Trails, and other signs:

   Footprints--look around the beach near a like, pond, or stream. A good place is in mud puddles in a road, in snow or at any point a print may make a mark. Even dust from a foot or paw may amke a mark of deposited dust.

   Trails--the frequent use of the same path by animals may break down the grasses or even completely erase them so that a discernable trail is formed. Watching while hidden along such a trail will increase the opportunity of seeing an animal

   Other Signs--bear paw scratches on a tree, a dust bowl used as a dust bath by birds, slime track of some snakes and salamanders on a hard surface, snake tracks in dust, bedding places of deer and other animals in the grass

3. Sound Signals:

   Bird songs, calls and sounds--mating calls or songs, warning cries--as that of a crow, drumming of a beak on a tree or post or on a piece of metal, grouse "drumming" by flapping its wings while perched on a log.

   Mammal sounds--cries, roars, howls, pawing or stamping of hooves, antlers rattling against tree branches

Animal Signs (cont.)

4. Feeding signs:

Plant eating animals--nibbles plants and trees, scatter of crumbs and food pieces on ground, dug up bulbs and roots of plants. Mushrooms on tree branches are stored there by red squirrels for future eating, nuts in tree hollows are evidence of squirrels

Animals that eat other animals--bits of feathers, fur, blood or bones, owl pellets, shells of beetles, destroyed birds nests and eggs, broken open water life shells

5. Scent Signals:

Deliberate scents--these are used to discourage other animals from following and/or eating the prey, the skunk is known to all, mink and other animals use musk glands to secrete a musky scent which animals find unpleasant. Some animals leave a scent to warn others of their species of danger. Caribou are known to do this. Many animals leave scents on purpose to warn of the boundries of their hunting territory such as dogs do to trees.

Unintentional scents - these are the natural body smells of the animal--they may leave a trail by which the animals natural enemies track them down.

6. Touch Signals:

Defending young--birds use their beaks, wings, and talons. Some large mammals butt with their heads or horns, many use hooves, many use teeth and paws to deliver the message.

Fighting for a mate--many of the hooved mammals use the head, horn, and antlers to drive away another animal seeking the attention of the lady of his choice. Pheasants and other fowl use their spurs to the same effect. Much of the fighting in trying to gain a mate is not as serious as it appears - a great deal of it is bluff - to try to appear bigger or stronger than one's rival.

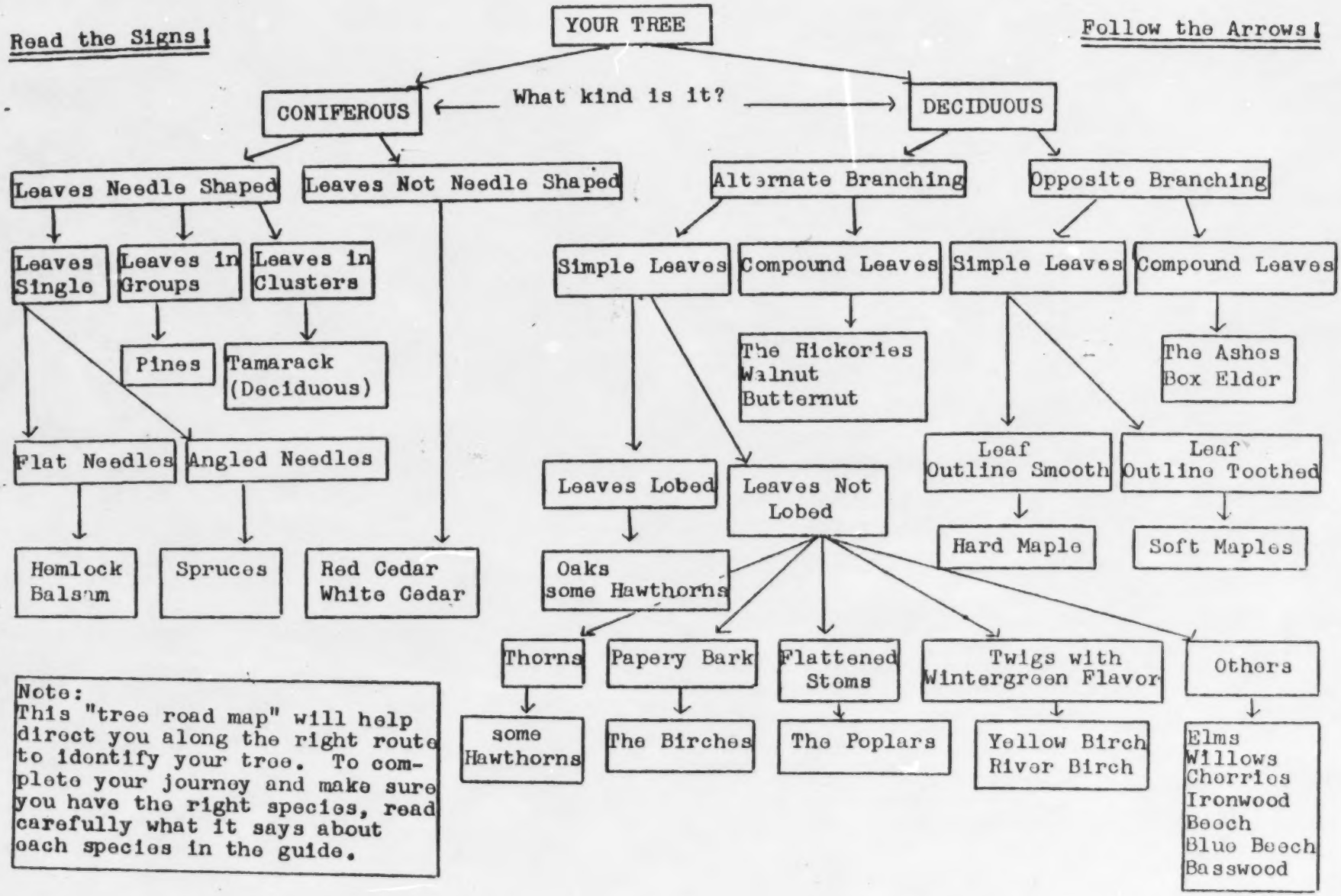
Teaching young--many animals use touch signals to teach their young or to make them mind. Female bears use their strong front legs to swat a cub who is moving too slowly or wanders away. Foxes snap at their young, not hard enough to break the skin, but a hard pinch results.

7. Sight Signals:

Signalling danger to others--deer flash their flag to warn the rest of the herd that something is amiss. The white

rump of the pronghorn antelope is a signal to the rest of the herd to "follow me out of here--fast".

Signalling danger to enemies--the snake coiled is a warning of danger, the raised hair on the back of a dog, cat, wolf, etc. does the same thing--it is a warning to, "stay out of my way". The ruffled feathers of many fowl serve to the same effect. A bear up on his hind legs can be a warning, certainly when a skunk raises his tail anyone within range had better leave--quickly!


Read the Signs!
YOUR TREE
Follow the Arrows!
What kind is it?
CONIFEROUS
DECIDUOUS
Leaves Needle Shaped
Leaves Not Needle Shaped
Alternate Branching
Opposite Branching
Leaves Single
Leaves in Groups
Leaves in Clusters
Simple Leaves
Compound Leaves
Simple Leaves
Compound Leaves
Pines
Tamarack (Deciduous)
The Hickories Walnut Butternut
The Ashes Box Elder
Flat Needles
Angled Needles
Leaves Lobed
Leaves Not Lobed
Leaf Outline Smooth
Leaf Outline Toothed
Hard Maple
Soft Maples
Hemlock Balsam
Spruces
Red Cedar White Cedar
Oaks some Hawthorns
Thorns
Papery Bark
Flattened Stems
Twigs with Wintergreen Flavor
Others
some Hawthorns
The Birches
The Poplars
Yellow Birch River Birch
Elms Willows Cherries Ironwood Beech Blue Beech Basswood
Note:
This "tree road map" will help direct you along the right route to identify your tree. To complete your journey and make sure you have the right species, read carefully what it says about each species in the guide.

A-7

OUTDOOR EDUCATION

SOIL

Materials: Soil testing kit, soil or water, beaker, litmus paper, paper cups

Directions:

1. Obtain soil from several areas.
2. Place some soil from each sample in paper cups and label.
3. Add enough water to make the soil fairly moist.
4. Place a piece of each type of litmus paper in each cup (blue and red).
5. After five minutes or so, remove the litmus papers from each cup and place them in front of each cup.

Observation: What types of soil have you tested?

If blue turns red - Acid in nature
If red turns blue - Alkali in nature
If no change, the soil is neither acid nor base.

Color	pH	Reaction		
Violet	8.5	Alkali	Too Alkaline for plants	
Blue	8.0	Alkali		
Blue Green	7.0	Neutral	Beets Plums Onions	Cabbage Oranges Lettuce
Light Blue Green	6.5	Very Slightly Acid		
Green	6.0	Slightly Acid	Apples Spinach Radishes	Cucumbers Watermelons Lima Beans
Dark Yellow Green	5.5	Medium Acid		
Yellow		Strongly Acid	Grapes Parsnips Pumpkins	Potatoes Strawberries Pine Trees
Light Yellow Green	4.5	Very Strongly Acid		
Yellow	4.0	Very Strongly Acid plus	Blueberries Magnolia Certain Fern	Cranberries Holly Azalea

WEATHER STATION OBSERVATION

DATE---------- _____

TIME---------- _____

BAROMETER----- _____ INCHES RISING _____

STEADY _____

FALLING _____

DRY BULB------ _____ DEGREES

WET BULB------ _____ DEGREES

HUMIDITY------ _____ PERCENT

TEMPERATURE--- HIGHEST _____

LOWEST _____

PRESENT _____

WIND---------- DIRECTION FROM _____

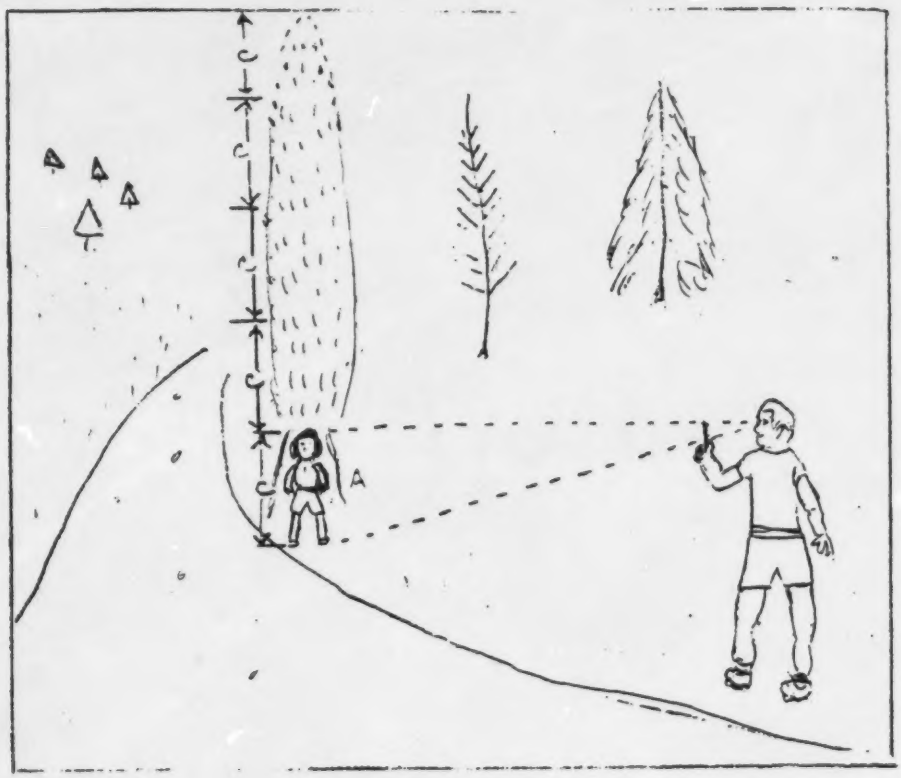
SPEED _____ MILES PER HOUR

CLOUDS-------- _____

PRECIPITATION- _____ INCHES _____

PREDICTION

HOW TO MEASURE HEIGHT USING PENCIL AND/OR STICK METHOD



Procedure:

1. Have person whose height is known stand before the object to be measured (A). If you can find a person who is 4'6", 5' or 5'6" tall, it will make the computation much more simple. This person is the <u>standard measure</u>.

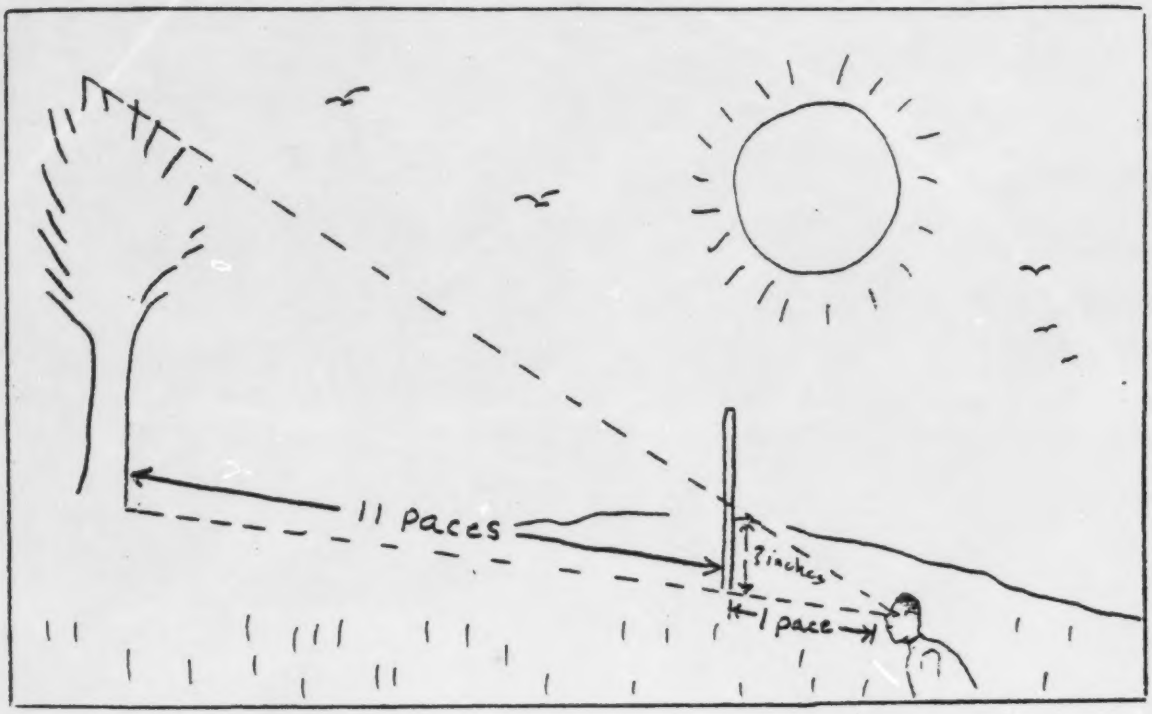
2. Hold a pencil or stick at arms length. Sight over the top of the stick to the head of the standard measure (A). Place the thumb (B) on the pencil or stick where the line of sight meets the base of the object being measured (A).

3. Determine how many times the standard measure will go into the object whose height is being judged by moving the pencil or stick up the (tree) a standard measure at a time (C).

Example: If a 5' standard measure goes into the tree 2½ times, the tree is 12'6" high.

HCW TO MEASURE THE HEIGHT OF A TREE USING THE

ELEVEN TO ONE RATIO METHOD



Procedure:

1. **Starting from base of the tree walk eleven paces and push a stick in the ground.**

2. **Continue one pace further and place a mark. At this point have a person lie on the ground and sighting with the eye, project a line past the stick to the top of the tree.**

3. **The height of the stick where the projected line passed the stick gives in inches the height of the tree in feet.**

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